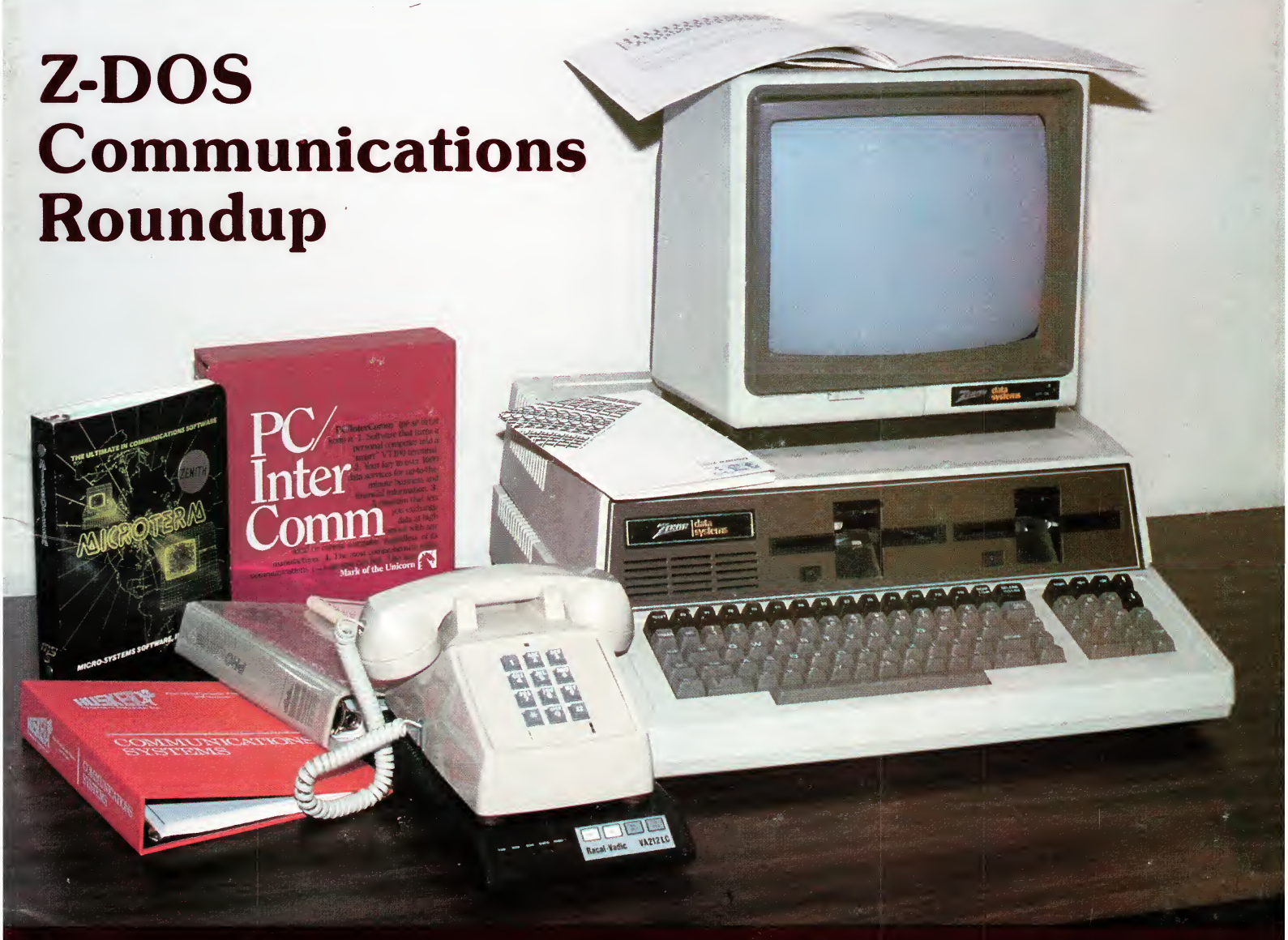
Index to
Sextant
#1–#12

SEXTANT®

$2.95
Issue #12
September-October 1984

The Independent Magazine for the Entire Zenith Computer Community
and Users of Zenith-Compatible Computers

Z-DOS Communications Roundup



Dual Speed on Your '89

1-2-3 and Forth Customized for Heath/Zenith Computers

SEXTANT

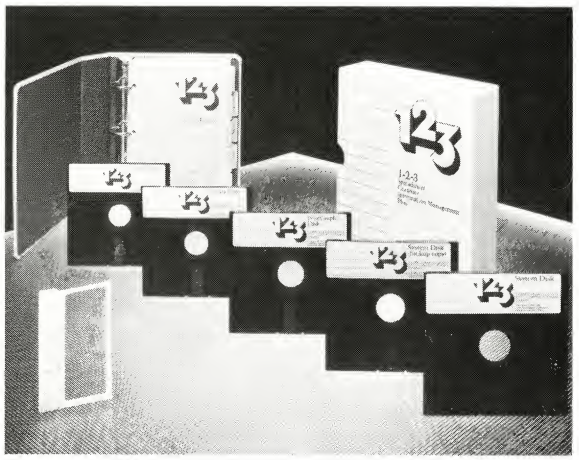


Photo courtesy of Lotus Development Corporation

47 Spreadsheets are great for doing all your accounting—but what if you need to put the data into a graph? And what if you need a certain amount of data-base ability at the same time? Lotus Corporation was the first to put those three capabilities into one product, available for the '110/120 and the '150. They may have competition now, but they still lead the pack.

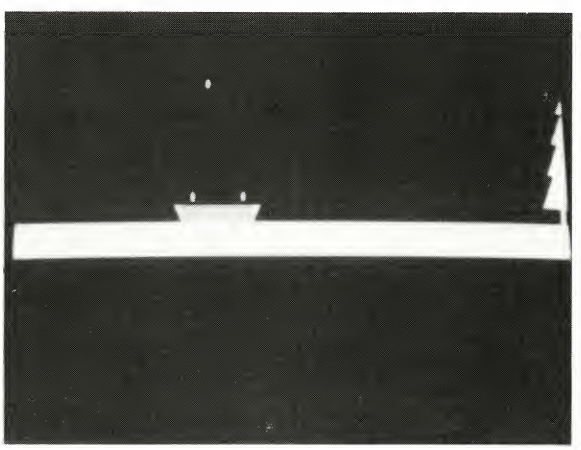


Photo by Charles Floto

65 True, maybe the graphics-character set available to the H8 and H/Z89 is not suitable for drawing the Mona Lisa. But this little MBASIC program may set you thinking about how much you *can* do with Heath/Zenith's graphics characters.

Features

You Can Take It With You: Your Computer in a Low-Tech Environment
Ray Albrektson 11
Does your computer cringe when you talk about moving to the tropics? Have you put off joining the Peace Corps (or taking that promotion to the overseas office) because you couldn't play Adventure in Timbuctoo? Well, taking your computer with you probably won't be a sleigh ride. (You need snow for that.) But with some common sense and planning, your computer can relocate with you just like the rest of the family. Here's how—by someone who's there.

Dual Speed on Your '89
Alan K. Gideon 17

BASIC Grocery Shopping
Robert L. Schlessman 23

Forth Goes Heath/Zenith
Brian and Christine Ence 27
Forth is one of those programming languages that has a devoted following; but it hasn't seemed to catch fire with really large numbers of programmers. HForth-79 is a version meant especially for use on Heath/Zenith computers. It's meant to overcome some of the difficulties some have found with Forth, while retaining its virtues. Here's an introduction to both Forth and HForth.

Communing by Computer
Frederick Zimmerman 41
Your friends in the Heath Users' Group are as close as your terminal and your telephone. All courtesy of CompuServe and HUG, who are helped by some volunteer System Operators (and an automatic monthly payment on *your* part, of course). You can learn a lot on CompuServe's HUG Special Interest Group.

1-2-3 for the '110/120
Wayne Rash, Jr. 47

Introduction to Pascal: Part 2
William Tavolga 57
When you decide to move up from BASIC, programming in Tiny Pascal is an effective, inexpensive way to learn. But you should know that from Part 1 in issue #11, shouldn't you? Now you can continue the march. Loops and repetitions lead off this installment.

Issue #12
September-October 1984

A Canoe Ride in MBASIC
Raymond Dotson 65

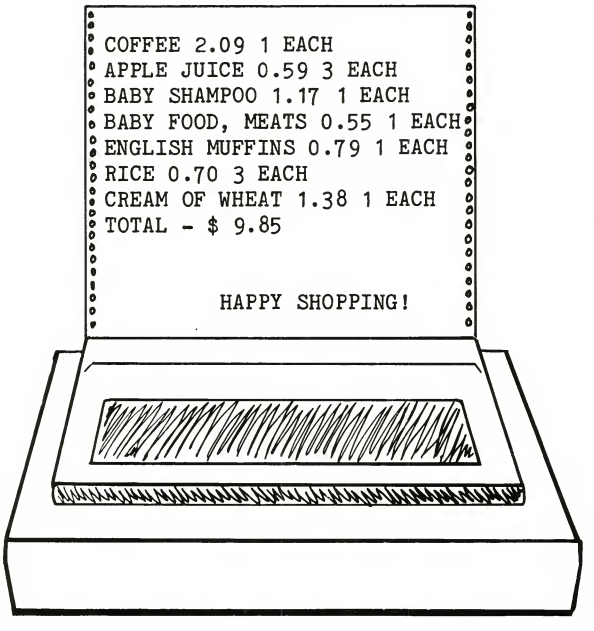
Z-DOS Communications Roundup
Frederick Zimmerman 69
Sooner or later you have to talk to someone else besides your H/Z110 or '120. But it's easier if you let your '100 help. All you need is a modem, a phone, and the right software. Then, still sitting at home, it's off you go to the world of bulletin boards, electronic mail, stock quotations, and who knows what else. Here's a look at the software.

Index to *Sextant* #1–#12 78
Arranged by subject matter, this covers our first dozen issues, from Spring 1982, when we started as a quarterly, through September-October 1984, this issue.

Departments

The Editorial Eye	3
Letters	5
Index to Advertisers	66
Scuttlebutt	81
Classified Ads	82
Luminaries	82
Supplier Notes	84

Cover photo by Charles Floto and Elizabeth Saxon


COFFEE 2.09 1 EACH
APPLE JUICE 0.59 3 EACH
BABY SHAMPOO 1.17 1 EACH
BABY FOOD, MEATS 0.55 1 EACH
ENGLISH MUFFINS 0.79 1 EACH
RICE 0.70 3 EACH
CREAM OF WHEAT 1.38 1 EACH
TOTAL - $ 9.85
HAPPY SHOPPING!

23

Let's face it: some of us do buy more at the grocery store than peanut butter and crackers. Ever gotten to the check-out counter and found that you hadn't brought enough cash? Ever get back home and find you'd forgotten to get the rutabaga? So why not let MBASIC and your computer help you out?

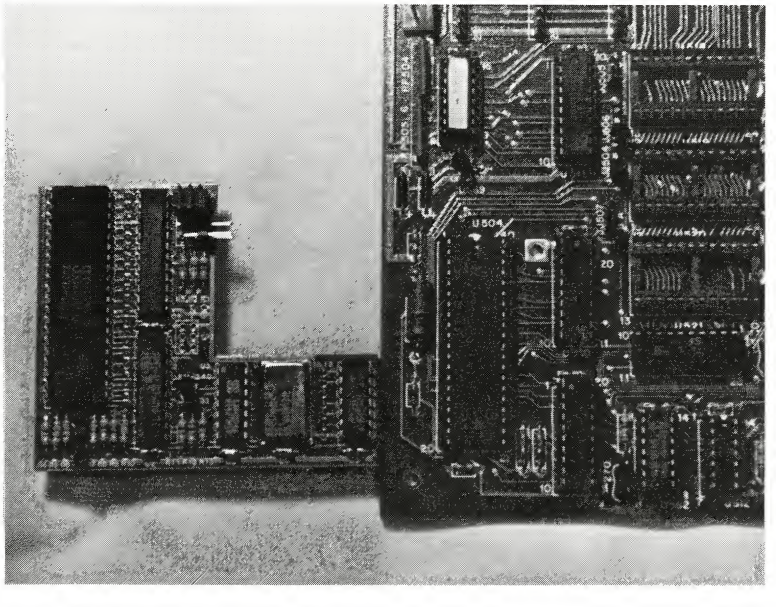
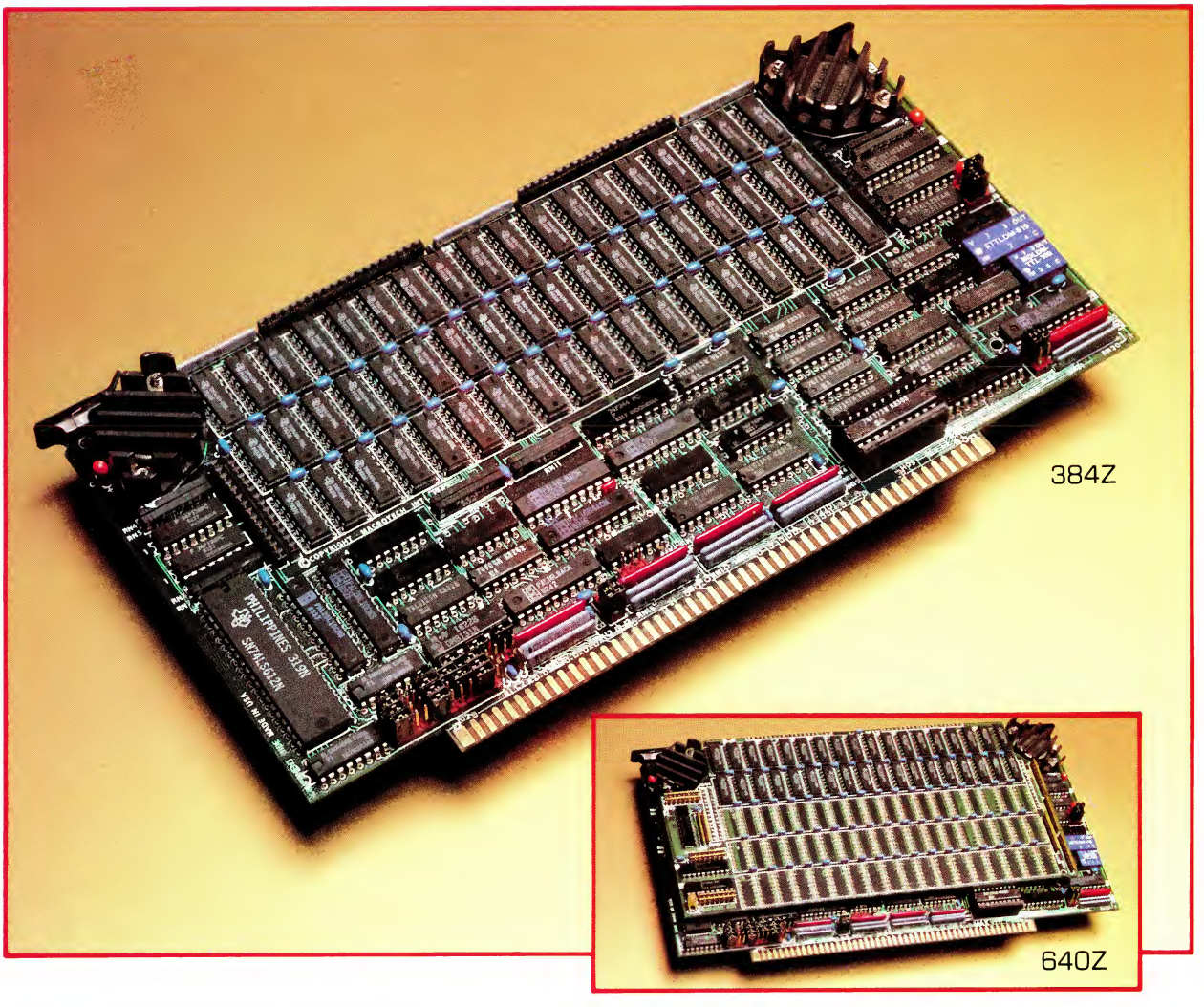


Photo courtesy of Kres Engineering

17

One of the biggest reasons to think about buying a new computer is speed. The new ones are faster, right? Well, not necessarily. Your H/Z89 can keep up with the new kids on the block—courtesy of Kres Engineering. Their DSM-240 can speed you up from 2-megahertz operation to 4 MHz. And you can easily switch back to 2 MHz for any of your software that doesn't take kindly to being rushed.



SUPERCHARGE YOUR Z-100 SYSTEM

Macrotech announces three new memory products for Zenith Z-100 computers. Designed specifically for Z-100 systems, our Z-Series can increase your main memory up to a full megabyte with the use of only one expansion slot.

• Includes unique, lightning-fast "Macrocache"™ pseudo-disk operating software enabling dynamic memory allocation between full cache mode and "virtual disk" mode. • Runs under Z-DOS* or CP/M 86. • Full byte parity (standard on all Macrotech S-100 dynamic memory products).
• Comprehensive technical manual included. • Full one year warranty.

PRICES:

384Z—Adds 384K high speed dynamic RAM	$1,195.00
640Z—Adds 640K high speed dynamic RAM	$1,895.00
896Z—Adds 896K high speed dynamic RAM	$2,250.00

Macrotech also offers ADIT, the only full-featured intelligent I/O expansion module for S-100. Utilizing full DMA, the ADIT provides up to 16 full duplex RS 232/RS 422 channels from one expansion slot.

For more information about the Z-Series of Z-100 memory products, or the ADIT intelligent I/O board, contact your local Zenith dealer or Macrotech International Corp.

* Z-DOS is a registered trademark of Zenith Data Systems.
CP/M is a registered trademark of Digital Research.

MACROTECH INTERNATIONAL CORP.
9551 Irondale Ave., Chatsworth, CA 91311, (818) 700-1501

Circle #149 on Reader Service Card

SEXTANT

Charles Floto
Editor
Publisher

Sharon E. Conaway
Assistant Publisher
Advertising Manager

Elizabeth P. Saxon
Production Manager
Marketing Assistant

Jennie D. Allen
Managing Editor
Production Assistant

John Walker
Technical Editor

Frederick Zimmerman
Staff Writer

John Gill
Subscription/Retail
Service Manager
Production Assistant

Gabriele Burkhard
Circulation Assistant

A. Victoria Saxon
Production Assistant

David R. Felstul
Writing Intern

Daniel M. Conaway
Summer Assistant

Subscription Service • 202/544–0900
Advertising Inquiries • 202/544–2868
Authors' Inquiries • 202/544–2867
Charles Floto • 202/544–0484

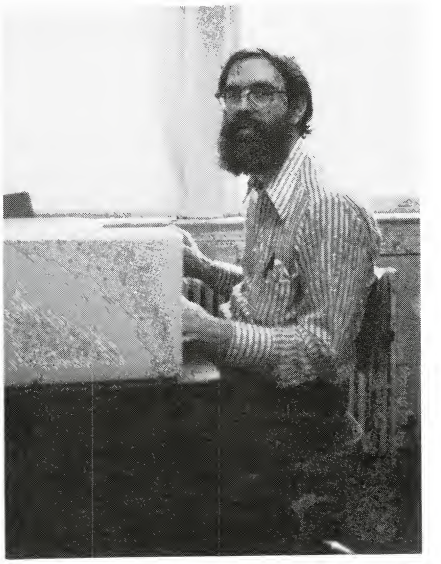
Sextant (ISSN 0731–2180) is published bimonthly by Sextant Publishing Co., 716 E Street SE, Washington, DC 20003. Second-class postage paid at Washington, DC and at additional mailing offices. POSTMASTER: Send address changes to Sextant, 716 E Street SE, Washington, DC 20003.

Copyright© 1984 by Sextant Publishing Co. All rights reserved. No part of this publication may be reprinted or otherwise reproduced without written permission from the publisher. Printed in the USA by The Sheridan Press, Hanover, PA 17331.

Subscription rates: 6 issues (1 year) in U.S.—$14.97; in Canada and Mexico—$17.25; overseas—$21.00. Payment accepted by check in U.S. dollars payable on a U.S. bank, by U.S. and international postal money order, and by Visa and MasterCard. Please allow six to eight weeks for delivery.

"Heath" and "Heathkit" are trademarks of the Heath Company. "CP/M" is a trademark of Digital Research.

The Editorial Eye



This editorial should reach many *Sextant* subscribers around Labor Day, but I started typing it on Independence Day. The independence of *Sextant*, which is among its important distinguishing characteristics, derives in part from a strong tendency within my family. Like the independence commemorated in Fourth of July celebrations, it is closely linked to rebellion. In my grandmother's case, this spirit of rebellion and independence was most frequently expressed in the face of packages bearing three words: OPEN OTHER END.

I have a similar attitude toward being told what to do. Any tendency I have toward playing by the rules is based largely on taking pride in not having to do otherwise. I prefer to be guided by my feelings of responsibility to my employees, subscribers, and advertisers.

At Sextant Publishing Company, I enjoy the challenge of developing an economic activity above the level of basket weaving without being more "businesslike" than suits my inclination. (Did I say *suits*?; some people infer it's a special occasion when I'm seen wearing *shoes* in the office.)

While I insist on doing things my way, I don't expect the rest of the universe to cooperate. Thus, the company carries fire insurance. And I've purchased a policy on my own life calculated to provide my survivors with enough cash for either carrying on without me or closing the enterprise down gracefully.

The big news here is that Jennie Allen has agreed to formally assume the responsibilities of managing editor. She didn't seem interested in the promotion when I suggested it to her some months ago. Maybe she finally noticed that didn't prevent her being informally loaded down with most of the work involved in the job.

Jennie will be managing our editorial resources. She'll be keeping track of correspondence with authors, moving their articles through the stages leading up to publication, and reminding Technical Editor John Walker and me what we should be working on. The challenge of this last task is only hinted at by some of my remarks above.

We've had a few requests for an index to all the articles which have appeared in *Sextant*. It seemed like a good idea to us, too, so we're including one in this issue. We welcome your further suggestions.

As I've noted in previous issues, we expect you to judge *Sextant* by the same standards you apply to the other magazines you read. Let us know what we're doing well, and not so well. We gather many subscribers appreciate having the magazine mailed in a plastic wrapper. We intend to continue to do so, even though most publishers apparently aren't willing to incur this additional expense. But most publishers of computer magazines are interested only in serving larger communities than ours. That's fine with me. I have no particular desire for competition. I'm having about all the fun I have time for right now.

Charles Floto

ACCESS™ with Autopilot™ —

The State of the Art in Communications Programs

- Talk to bulletin boards, information utilities, main frames or other micros
- Send and receive any kind of file—text, binary, .EXE, .COM, etc.
- Transfer files using a variety of protocols, including XMODEM protocol
- Use Autopilot to turn your computer into a communications robot

NEW • Unattended auto-answer mode configures to caller's baud rate, and
NEW • Depending on caller's password, grants unlimited, limited, or no access
NEW • Logs password, duration, date and time of calls you receive
NEW • Logs calls you place—recording number dialed, duration, date & time
NEW • Compatible with all modems, even USR S100 and other board modems

Start Communicating Right Away!

You can start communicating as soon as you pull ACCESS out of its package. We don't make you learn a strange new language of names and symbols the way most programs do. Our customers proclaim it—ACCESS is the easiest and fastest to use!

Autopilot—Your Own Communications Robot

Autopilot can dial, log on, send or receive, answer prompts, even make decisions. Sit back and relax while Autopilot does your work for you.

While you eat dinner or watch TV, have Autopilot call the local bulletin boards, pick up messages to you, drop off messages to others, and collect the classified ads for you to go through later.

Have Autopilot reduce your telephone and timesharing bills by making calls for you late at night, when rates are lowest. When you get up in the morning, your computer can be chock full of fresh information, just like your morning paper.

Instant Links with Other Micros

ACCESS gives you instant phone-links with any other 8-or 16-bit microcomputer for fast, efficient file transfers or just to chat. Or you can direct-cable your computer to others.

And ACCESS answers calls and lets people with one of your passwords have either limited or unrestricted use of your system. . .including freedom to run programs other than ACCESS!

Make Those Tough Connections

Again and again our customers have thanked us for the power to talk with main frames, minis, and specialized networks, with emulators, microcontrollers, and development boards. And you'll thank us too, when ACCESS gets you into systems that defy people with other programs.

Don't Let Your Computer Act Dumb!

Other programs only let your computer act like a dumb terminal while you're on line, but ACCESS leaves the full power of your computer in your hands. Not only can you view your directories and files, you can run your other software—without leaving ACCESS or hanging up the phone.

What Makes ACCESS So Powerful?

To make ACCESS so easy to use, yet fast and flexible, took state-of-the-art programming and years of evolution. To achieve compact power, ACCESS is written in C, the language used to write the famous operating system UNIX. And ACCESS is interrupt-driven for ultimate speed with reliability.

How You Can Get ACCESS

Buy ACCESS from your local Heath or ZDS dealer. If there isn't a dealer near you, order it direct from Hilgraeve Inc.

ACCESS, H/Z-89 with CP/M (2.0 or later and 64K req'd). . . $49.95
ACCESS, H/Z-110 or 120 with ZDOS, CP/M-85, or CP/M-86 $59.95
ACCESS, H/Z-150 or 160 with MSDOS or CP/M-86. . . . . $69.95

Add $3.00 shipping; MI residents add 4%

Hilgraeve Inc. P.O. Box 941 Monroe, MI 48161 (313) 243-0576

Circle #203 on Reader Service Card

Letters

ZDS Training Packages

We read with interest Fred Zimmerman's article "Educational Software Roundup," in *Sextant* #10, May-June 1984. The information provided was helpful; however, some useful educational software packages were not listed.

As new users of Heath/Zenith equipment, having recently acquired a Z100, we are very interested in training packages that will help us learn to use our computers. Consequently, we were surprised to not see ZDS training packages other than ZDS Teacher/Student listed. Courses valuable to the new Z100 user include the following ZDS courses: MS-DOS/EC1121, CP/M/EC1120, Microcomputing/EC1020, and language courses on BASIC, Pascal, FORTRAN, COBOL, and Assembler. True, these courses are not totally computer-based, but most include a disk with exercises to be done on the computer.

I have also seen ads recently for training packages for Condor.

We enjoyed the article and hope it can be published again and include some of the training programs that were not listed.

Michael D. Lewis
Papillon, NE

Number Crunching is Real Life

I would like to make some brief comments in response to Mr. Zimmerman's review of the Dynacomp Management Simulator (pages 51, 52, *Sextant*, May-June 1984). On the whole the review was accurate, even though Mr. Zimmerman was clearly not objective; he is certainly not appreciative of the simulation programs used by Harvard, Cornell, Xerox, Kodak, etc., from which this simulation was closely derived.

First a correction. The Dynacomp Management Simulator is *not* available for the H89 unless 8" disks are used. We have had many calls from H89 owners.

Second, Mr. Zimmerman should not disdain training in the "number crunching" approach to management. Sorry, Mr. Zimmerman, but like it or not, "number crunching" is *real life* in big business. If a person wishes to exist in that environment, knowledge of the financial methodology is a must. Otherwise, stick to woodworking or basket weaving and keep it simple.

Regarding Mr. Zimmerman's comment on ease of use, I restate it in its entirety: "All text is presented in unsightly uppercase." I think that must be the response to something else! Also, quite frankly, I find uppercase more legible on a video monitor than lowercase. However, everyone has their own likes and dislikes.

Finally we have "Other comments": "Management Simulator isn't quite fun enough to be a game, and it's time consuming, so I'd recommend it only to teachers interested in using it in class." What odd reasons for recommending a program for school use! How about recommending it to people who are seriously interested in playing with the ideas of supply and demand, competition, manufacturing, advertising, etc.?

Mr. Zimmerman is a victim of *expectations*. He was reviewing games and expected a management simulation which did not use tables of numbers, but something more visual. The clue is in his complaint that "the product is literally an abstraction."

For the romantic, that's the way it is! That is why good managers can move from cereal companies to appliance manufacturers: only the name of the product and its describing parameters change. Dynacomp's Management Simulator deals with management, and is not an entrepreneurial adventure game.

Dr. F. R. Ruckdeschel, President
Dynacomp, Inc.
Rochester, NY

Dreieich Store Still Repairs Computers

Just a line to let you know that my previous letter to you [*Sextant* #10, May-June 1984] was in error when I stated that the Heathkit Electronics store (now Zenith Data Systems store) in Dreieich, West Germany, no longer repaired Heath products. They *do* still repair Heath computer products but not the other Heath products (e.g. scopes, voltmeters, etc.), which must be sent to Dusseldorf.

Tom Putnam
Frankfurt, West Germany

P.S. Glad you're putting the CP/M guide out. I know I sure need one!

[The Flipfast Guide to Zenith/Heath CP/M 80/85 *is published by S-A Design Books. Mail-order copies are available from Sextant Publishing Co. for $12.95 plus shipping. (See ad on p. 50.)]*

Don't Code Graphics in Assembler

The "Graphics Algorithm Optimized for the 8080 or Z80" described by Dave Troendle in the May-June, 1984 edition of *Sextant* is referred to as the "Bresenham" algorithm in *Fundamentals of Interactive Computer Graphics* by Foley and Van Dam, Addison-Wesley Publishing Co., 1982. Yes, as so often happens in this industry, Dave and his friends independently re-discovered a known algorithm. This method of determining the pixels that best approximate a line should be familiar to many Microtran customers, as it has been an integral part of the Micro-Core graphics package for 1½ years.

Although Dave and his friends did not score a "first," congratulations are nonetheless in order. Unlike the description in *Fundamentals*, Dave's explanation of the algorithm's background logic is excellent. His observation that similar scan-conversion algorithms can be derived for curves other than straight lines and circles is particularly significant. This article alone is sufficient reason to always hang on to my May '84 *Sextant*.

Although the explanation is outstanding, at least one recommendation is not as well considered. The suggestion that the algorithm should be re-coded in assembly language to improve speed totally ignores consequent adverse effects on code portability and maintainability. Our industry is gradually becoming aware of the overriding importance of these two virtues; but apparently we still have a long way to go toward omnipresent enlightenment. Unless there is some specific critical operational requirement (such as a tight real-time window), portability and maintainability should never be sacrificed simply to squeeze out the last bit of speed.

In an attempt to shed some quantitative light on this point, a Micro-Core program which draws circles was tweaked to determine the amount of time spent in each of the three levels of graphics picture generation. Several

Graphics Functional Level	Approx. Time Contribution
High level: Cartesian-to-dot coordinate conversion with window clipping	80% to 50%
Intermediate level: scan conversion (Bresenham)	10% to 20%
Low level: lighting pixels	10% to 30%

Table A. Average time spent in each of the three levels of graphics picture generation.

variations were run, including measurements with and without 9511 math chip support, and ballpark averages for each of the graphics functional levels were determined. The results are shown in Table A.

Micro-Core's intermediate-level Bresenham code is written in FORTRAN. Although an assembler version was not developed, it is clear that, even if assembly code were to reduce the time in the intermediate level to near-zero, the savings would not be more than 10 to 20 seconds of every 100 seconds spent in the graphics package. Such a marginal speed increase is not worth the effort of re-developing the code for each new machine, or of obscuring the subtleties of the algorithm's implementation with assembler gibberish. Therefore, in general, the Bresenham algorithm should *not* be written in assembler, but should be left in high-level language form. This is the approach Microtran has taken with Micro-Core. Like the Bresenham algorithm itself, it's the way to go.

Rick Lutowski
Microtran Co.
San Jose, CA

De Facto Standard

It was with great interest I read that the IBM Personal Computer is the de facto standard for scientific data gathering by our military forces. [Scuttlebutt, *Sextant* #10, May-June 1984.] This statement alone raises a question of what type of data retrieval one would use the IBM PC system for (with available analog/digital interfaces). Yes, it might be a good system for taking water temperature, but not much else.

When one looks at the facts, the IBM PC is no giant when it comes to processing true scientific data, analog or data base. It is at best slow, but it has big blue letters that everyone recognizes. Even an Apple can outperform the IBM PC when it comes to this type of requirement.

There are several S-100 analog/digital bus cards available, but I do not know what software is available. Writing software for this type of use is rather easy; and for the most part, software written would need to be customized to realize best performance, using compiled BASIC, Pascal, or FORTRAN language.

If anyone is going to make the statement about who is the de facto standard for analog/digital scientific data, and data evaluation, it should be given to the 9800-series desk-top Hewlett Packard computer, using HP BASIC. (Note, HP BASIC looks like BASIC, but is a mixture of Pascal and FORTRAN married to BASIC statements for ease of programming and super speed.)

In general, from what I see of purchasers of IBM PC computers, they are not the most swift individuals in their evaluation of high-tech hardware; but Big Blue sure has a good image at cocktail parties for impressing the non-user. I almost went blind trying to use their CRT since everything is one large blur; and the keyboard must have been designed by a Neanderthal on his off day, or a genius desiring to create the joke of the year.

Another note about the IBM PC is what I have seen in the frequency of repair they require. If I was going to depend on the IBM PC for my livelihood, then I would buy two, hoping I could at least keep one running. I have had, or am using at present, an H8, H89, and an H100 which I have never needed to have repaired, which is enough said for anyone.

Bert Rathkamp
Cincinnati, OH

Z150 Gets the Job Done

It seems to me that you have made it a duty, via *Buss* and *Sextant*, to let Heath know just what a horrible mistake it made in the Z150 and Z160. Every issue has at least one slam. I, for one, dissent in that I think it shows Heath/Zenith has adjusted to reality.

The best computer for the end user is one that gets the job done. This means that the most popular computer is the computer of choice because it offers the broadest selection of software and hardware. No matter what the job, you are probably going to find someone is selling what is necessary to make the popular machine do it.

Even the quality buff will find himself disappointed in the long run. Hardware and software producers will turn out state-of-the-art products for the most popular machine first and the others later, if at all. Heath has been pretty good at persuading them to make special versions of their products for us, but that is hardly a substitute. I am afraid that our Heath community, though it is the most active and brilliant of all, cannot really compete either with the quality of goods produced by the pros—no one ever wrote a WordStar or good accounting package for HDOS.

Rather than trying in vain to set its own superior standards which everyone save ourselves ignores, Heath has made a machine which is compatible with IBM but better than IBM made theirs. Heath's strength is not really technology (though they do very well there), but their attitude: "We won't let you fail," which, in the end, is more important to the customer than a bushel of gee-whiz circuits. Therefore, the Z150 is at once the most popular and the best.

Gary Martin
Bothell, WA

Screen Dump Enhancement

Here [Listing A] is an enhancement to "Screen Dump" by Siebert Ickler, presented in Issue #9 (March-April 1984).

Thank you, Siebert, for an excellent utility. I have used FSPRINT on a number of occasions, mostly to dump the CRT

```
        Add the following EQUate statements :

CONOUT  EQU     2       ;BDOS console output function
ALPHA   EQU     65      ;ASCII "A"
KILO    EQU     75      ;ASCII "K"


        Insert the "CALL  ERALIN" statement in the START routine :

START   EQU     $
        IN      CSTAT
        STA     INT
        CALL    ERALIN  ;subroutine to erase "FSPRINT" command line
                        ;before reading CRT contents from memory
        XRA     A
        OUT     CSTAT
        LXI     H,BUFFER


        Add the following code just before the END statement :

ERALIN  LXI     H,ERA   ;point H to address of DB statement

GETCHAR MOV     A,M     ;Get a character
        CPI     0       ;check if Null character (end of file)
        RZ              ;return if end of file
        PUSH    H       ;save the pointer
        CALL    CHAROUT ;output a character to CRT
        POP     H       ;recall the pointer
        INX     H       ;increment it
        JMP     GETCHAR ;go do another character

CHAROUT MOV     E,A
        MVI     C,CONOUT
        JMP     BDOS

ERA     DB      ESCAPE,ALPHA    ;ESC A - move cursor up one line
        DB      ESCAPE,KILO,0   ;ESC K - erase to end of line
```

Listing A. Enhancement to FSPRINT which deletes the command line from the screen prior to reading the contents of memory.

RESOLUTION, SPEED, AND SILENCE

Superior Graphics and A Pseudo Disk for $495.

That's right, silence! Because when you plug the Interactive Graphics Controller/ Pseudo Disk into your H/Z89 or H/Z19-H8 system you not only get graphics that rival most 16 bit computers, you also get a high speed Pseudo Disk that does the work of another disk drive in your system, only much faster, and without all of that noise!

This upgrade stretches the horizons of your system into the future with High Resolution Graphics, Pseudo Disk Storage, 2 Trackball/ Joystick Interfaces, and 2 Parallel Printer Ports, all for one very competitive price.

Copy your CP/M or HDOS files to the Pseudo Disk and cut execution times as much as 80% over mechanical drives with disk I/O intensive programs. Files are even retained when you cold boot, and HDOS users can sysgen it as the boot device!

Take a good look at these features: • 3 pages of graphics, 640 by 250 pixels each • Mix text and graphics with independent scrolling • A remarkably easy-to-use high level driver that gives ANY language the power of fast graphics • Unmatched drawing speeds result from an advanced design which requires no handshaking or wait states • Use interlace mode and double the screen resolution to 640 by 500 pixels (requires Super19 or Ultra ROM) • Plug in up to 2 trackballs or joysticks for interactive applications (provisions for light pen) • 2 Centronics parallel printer ports with full support available • An alternate character set ROM socket to double the number of characters your screen can display (Script character set available) • Source codes available • European 50Hz compatible • Mounts professionally and easily into your H/Z89 or H/Z19-H8 and no existing features are sacrificed • 90 day limited warranty.

COMPARE	Northwest Digital Graphics-Plus	Cleveland Codonics Imaginator	SigmaSoft and Systems
Normal Pixel Resolution	512 × 250	504 × 247	640 × 250
Interlaced Pixel Resolution	n/a	n/a	640 × 500
Graphics Memory Size	16k	16k	64k/128k*
Number of Graphics Pages	1	1	3
Pseudo Disk Memory Size	n/a	n/a	64k/128k*/256k*
Super19/Ultra ROM Compatible	No	No	Yes
Vertical Graphics Scrolling	No	No	Yes
Type of Interface	Serial	Serial	Parallel
Independent Power Supply	No	No	Yes
Graphics Input Device Ports	n/a	n/a	2
Parallel Printer Ports	1*	n/a	2
Price/Performance Ratio	Good	Better	Best

*Option at additional charge.

Call or write NOW so we can rush our complete information package to you!

SigmaSoft AND SYSTEMS

"Support is the most important feature."

4488 Spring Valley #107, Dallas, TX 75234, (214) 392-1025

Copyright 1984 by SigmaSoft and Systems

The Interactive Graphics Controller is a trademark of SigmaSoft and Systems. H/Z89, H/Z19, and HDOS are trademarks of Heath Corp., Benton Harbor, MI. CP/M is a trademark of Digital Research, Inc., Pacific Grove, CA. Super19 is a trademark of Extended Technology Systems, Bensalem, PA. Ultra ROM is a trademark of Software Wizardry, St. Charles, MO. Codonics and Imaginator are trademarks of Cleveland Codonics, Inc., Cleveland, OH. Graphics-Plus is a trademark of Northwest Digital Systems, Seattle, WA.

Circle #185 on Reader Service Card

to printer following assembly of source codes. It is more convenient than remembering to use "CTRL P" prior to assembly.

The problem of dumping the command line, FSPRINT, along with the rest was a little annoying. But the process of enabling the 25th line to enter the FSPRINT command was even more so. This prompted me to tackle the task of deleting the command line from the CRT prior to reading the contents of memory.

This was accomplished by the simple process of moving the cursor up one line and then erasing to end of line. There is only one bug which is inherent to the original code. If your screen happens to be full, the action of typing the command line scrolls the screen up one line. Therefore you lose the top line of text or graphics in the dump to the printer. If you need the top line, then you have to enable the 25th line as described in the article.

My method uses the Heath escape codes sent to the CRT to perform the cursor move and delete line process.

Bob Moskus
Huron, OH

Let PeachText Silence Key Click

Various articles and letters have appeared in *Sextant* advising readers how to eliminate the Z100's annoying key click. My solution was to create an ASCII file with the necessary ESCx2, using the CHR$ function of Z-BASIC, then TYPE the file on bootup. However, my version of PeachText 5000 erases all such user-defined modes, and it took me several months to figure out how to get them back. The PeachText print routine, it appears, ignores nonprintable characters when printing to the screen, so that my attempt to turn off the click using the PRINT OFF, SCREEN ON commands with an appropriate text file resulted in failure.

The solution became clear once I realized that the PeachText help command, ?, accesses an ASCII file called PTHELP.DAT. This file can be edited in PeachText (like any other ASCII file) and the characters ESCx2 inserted in it using the OUT command. To get a disk file with "ESC" rather than " OUT 27" in it, you must print the file to the disk using the print command DISK ON. Since PeachText will format the disk file as it would printed output, you must be careful to set up the margins for literal output and disable all of PeachText's recognition characters. The following set of commands at the beginning of the PTHELP.DAT file will reproduce the old file exactly, except for the addition of the ESCx2 at the beginning:

```
DISK ON, PRINT OFF
TMO, BMO, LMO, RM99
OUT 27,120,50
BF, SSA, SSB, HY, UN, CMD
```

After printing this file, you will have a new file called PTHELP.PRN which should be copied onto your system disk under the old name, PTHELP.DAT. The next time you ask PeachText for help, you'll really get help.

Gary L. Scheidegger
Orlando, FL

CHUGCON 84

This is the fifth anniversary of CHUG. We plan to celebrate by making CHUGCON 84 into a regional conference that you will want to attend.

CHUGCON 84, the third annual CHUG regional conference, will be held on Saturday, November 3, at the beautiful Crystal City Hyatt Regency in Arlington, Virginia. The hotel is a stone's throw from National Airport, just across the river from Washington, D.C. Jeff Davis Highway runs in front of the hotel and weekend parking in the Crystal City area is free. Easy access to the new Metrorail subway places the entire Washington area within easy walking distance of the hotel.

Activities will include vendor display booths of Zenith compatible products, tutorials, demonstrations, a fantastic swap meet, nationally recognized luncheon and dinner speakers, door prizes, and more. Admission is free, but there will be a charge for the optional luncheon and dinner banquets.

For further information, write:
CHUGCON 84
JANR Technical Services
P.O. Box 10515
Alexandria, VA 22310
Or call:
Mike Supley, CHUG President
CHUGCON 84 Co-Chairman
703/435–1189 7 p.m.–9 p.m. EST
Or check the CHUG BBS 703/360–3812.

Copy Text from Screen

A few months ago I wrote you about a means of setting ESCape codes for the Z100, in order to eliminate the key click or to set any other machine parameters to desired values. (See page 5 of the March-April issue.) The parameters and their ESCape codes, of course, are those listed on pages B.14–B.17 of the Z100 Users Manual. The procedure that I suggested required a full-screen editor (such as Vedit, WordStar or Final Word) in order to produce ESCape characters in an AUTOEXEC.BAT file.

It turns out that there is an even simpler way to set up these codes in an AUTOEXEC.BAT or other batch file, using only the COPY command in Z-DOS. Although difficult to find in Z-DOS documentation, it is possible to copy text from the screen ("CON:") to a disk file ("D:FILENAME"), by typing a simple command followed by a carriage return, then typing the text of the file you want to establish, and finally ending the file with control-Z. ESCape characters are entered in the text with the F8 key. The following, for example, illustrates the sequence of lines for setting up an AUTOEXEC.BAT file that at each startup will establish a non-blinking block cursor, will eliminate the key click, and will ask for the date but not the time (*=ESCape character, produced by pressing the F8 key; ^=control; CR=carriage return; also note that the colon must be omitted from "CON:").

```
A:copy con autoexec.bat CR
*x4 *x; *x2 CR
date CR
^Z CR
```

As another example, the following will create a simple batch file to clear the screen and 25th line, and home the cursor.

```
A:copy con clear.bat CR
*y1 *x1 *E CR
^Z CR
```

Incidentally, after one of these batch files is executed, there will be two "A:" prompts, because of the carriage return at the end of the batch file. To eliminate this, also place a "^Z" at the end of the last batch-file line, just before the carriage return of that line (for example, "DATE ^Z CR").

A. Kent Christensen
Ann Arbor, MI

Spooler

I finally got around to finding the typing errors I had made in typing in the spooler program in your Summer 1983 issue [#6]. I also made some changes to it that make it run optimally with the Smith Corona TP-I. The changes I made cut down the time that the computer waits to fill up the printer's thirty-two character buffer. The change is as follows:

In the routine SCST1, and right after the statement INX B add:

```
            PUSH    PSW
            MOV     A,C
            CPI     32
            JNZ     RET
            POP     PSW
            JMP     SCST2
RET         POP     PSW
```

The very next line should then be:

```
            CPI     12Q
```

This change can be made to fit any other printer by substituting the printer's buffer size (in characters) in the CPI statement. The second change is in the system definition section. The change is applied to the definition CYCPC. It is as follows:

```
CYCPC   DW      60
```

This value is for the character delay time. It sets the delay at a good time for the Smith Corona.

Keep up the good work.

Jonathan Czerwinski
Huntsville, AL

Correction

The last paragraph in the second column of page 33 in *Sextant* #11 should read: "Microsoft BASIC's internal storage for a floating-point number occupies 32 bits, which are divided into three parts corresponding to these three components."

"Quality Software at Reasonable Prices"

Software for Your H8/H89

HDOS Products

TEXT PROCESSOR 4.1 FULL-SCREEN EDITOR	$ 59.95	
TOUCH TYPIST 2.0	$ 29.95	
VIDEO ARTIST PLUS, H19 GRAPHICS PROGRAM	$ 39.95	
H25/Z25 GRAPHICS GENERATOR	$ 44.95	
TOUR-700 GAME	$ 19.95	
UNIVERSAL SPOOLER	$ 29.95	
RESISTIVE NETWORK DESIGN	$ 24.95	
MX-80 DEVICE DRIVER	$ 29.95	
MODEM COMMUNICATIONS DEVICE DRIVER	$ 34.95	
MBASIC COMPUTER-AIDED-INSTRUCTION	$ 59.95	
HERO-1 ASM-68 6800 CROSS ASSEMBLER	$ 59.95	
DENSE-PAC DATA COMPRESS AND ENCRYPT	**$ 29.95**	**NEW**
UD.DVD UNIVERSAL PRINTER DEVICE DRIVER	$ 29.95	
MX.DVD MX-80 DEVICE DRIVER	$ 29.95	
H25.DVD H25 DEVICE DRIVER	$ 29.95	
UD.OVD/SPOOLER	$ 39.95	
MX.DVD/SPOOLER	$ 39.95	
H25.DVD/SPOOLER	$ 39.95	
SUPER SYSMOD 2	$ 29.95	
TINY PASCAL & DISASSEMBLER	$ 29.95	
HFORTH-79	$ 34.95	
DIAMOND ACCOUNTING SYSTEM	$ 74.95	
The ILLUSTRATOR GRAPHICS PROGRAM	**$ 89.95**	**NEW**

CP/M Products

TEXT PROCESSOR 4.1 FULL SCREEN EDITOR	$ 59.95	
TOUCH TYPIST 2.0	$ 29.95	
TOUR-700 GAME	$ 19.95	
DOMESTIC MGT. SYSTEM	$ 39.95	
CHECK PROCESSOR	$ 29.95	
TAXTYME 1983 FEDERAL INCOME TAX PROGRAM	**$ 59.95**	**NEW**
SNAP	$ 29.95	
MBASIC COMPUTER-AIDED-INSTRUCTION	$ 59.95	
HERO-1 ASM68 6800 CROSS ASSEMBLER	$ 59.95	
DENSE-PAC DATA COMPRESS AND ENCRYPT	**$ 29.95**	**NEW**
SUPERMATH 1 COMPUTER-AIDED-INSTRUCTION	$ 39.95	
UO.COM/SPOOLER	$ 39.95	
TINY PASCAL & DISASSEMBLER	$ 25.00	
dBASE II	$465.00	
AUTOMOBILE EXPENSE	**$ 29.95**	**NEW**
APPOINTMENT CALENDAR	**$ 29.95**	**NEW**
FILE CABINET	**$ 29.95**	**NEW**
H19/H89 BASIC GRAPHICS PRIMER	**$ 49.95**	**NEW**

Software for Your Z-100

ZDOS Products

Z-100 HDOS 2.0 UPGRADE	**$ 79.95**	**SPECIAL**
SAVE $60 . . . . includes FREE Z-100 HDOS Text Processor		
TEXT PROCESSOR 4.1 FULL SCREEN EOITOR	$ 59.95	
TOUCH TYPIST 2.0	$ 29.95	
CHECK PROCESSOR	$ 29.95	
dBASE II	$465.00	
SUPERMATH 1 COMPUTER-AIDED-INSTRUCTION	**$ 49.95**	**NEW**
AUTOMOBILE EXPENSE	**$ 29.95**	**NEW**
DIAMOND ACCOUNTING SYSTEM	$149.95	
FRIDAY	**$219.00**	**NEW**
The ILLUSTRATOR GRAPHICS PROGRAM	**$ 89.95**	**NEW**

CP/M-85 Products

TEXT PROCESSOR 4.1 FULL SCREEN EDITOR	$ 59.95
TOUCH TYPIST 2.0	$ 29.95

Newline's Z-100 HDOS 2.0 Products

TEXT PROCESSOR 4.1 FULL SCREEN EDITOR	$ 59.95
UD.DVD UNIVERSAL DEVICE DRIVER	$ 29.95
MX.OVD MX-80 DEVICE DRIVER	$ 29.95
H25.OVD H25 DEVICE DRIVER	$ 29.95
UO.DVO/SPOOLER	$ 39.95
MX.OVO/SPOOLER	$ 39.95
H25.DVD/SPOOLER	$ 39.95
SUPER SYSMOD 2	$ 29.95

Software for Your HERO-1

KEYPAD UTILITY CASSETTE	$ 24.95
HERO-1 ASM68 available for HDOS & CP/M	

Specials

TEXT PROCESSOR 4.1 for ZDOS & CP/M-85	**$ 99.95**	**SPECIAL**
Z-100 HDOS 2.0 with FREE Z-100 HDOS Text Processor	**$ 79.95**	**SPECIAL**

Nashua Diskettes

SSSO, 10 sector Hard	10 for $25.00, 20 for $45.00	
SSOO, soft	10 for $25.00, 20 for $45.00	
OSOO, soft, 48 TPI	10 for $33.50, 20 for $62.00	
OSOO, soft, 96 TPI	10 for $42.00, 20 for $79.00	
8", DSDD	**10 for $48.00, 20 for $91.00**	**NEW**

CALL FOR QUANTITY PRICING.

Newline Software

Send for latest catalogue

P.O. Box 289 • Tiverton RI 02878 401–624–3322

ORDER FORM

FOREIGN ORDERS—Surface postage included in price. Add $3.00 per package ordered for airmail shipment. Checks drawn on a non-U.S.A. bank must include $10.00 for check processing and funds transfer.

CANADA ORDERS—Checks drawn on a non-U.S.A. bank must include $3.00 for check processing and funds transfer.

Mail to: Newline Software
P.O. Box 289
Tiverton, RI 02878

OS = Operating System—Enter either HDOS, CP/M, Z-DOS, or CP/M-85. Be sure the product you are ordering is available for the OS you select.

Format = 5.25" Hard Sector (H17 Format) . . . use format code "H".
5.25" Soft Sector (H37 Format) SSDD, 48TPI . . . use format code "S".
8" SSSD (H47) Format . . . add $5.00 . . . use format code "8".
Z100 Software is in DSDD, 48TPI format. . . use format code "Z".

Quantity	Product Description	OS	Format	Each	Extended

S12-83

Rhode Island residents must include 6% Rhode Island Sales Tax . . . .

SUB TOTAL _____

RI SALES TAX 6% _____

TOTAL _____

☐ Please send latest product catalogue.

NAME _____

STREET _____

CITY _____ STATE_____ ZIP_____

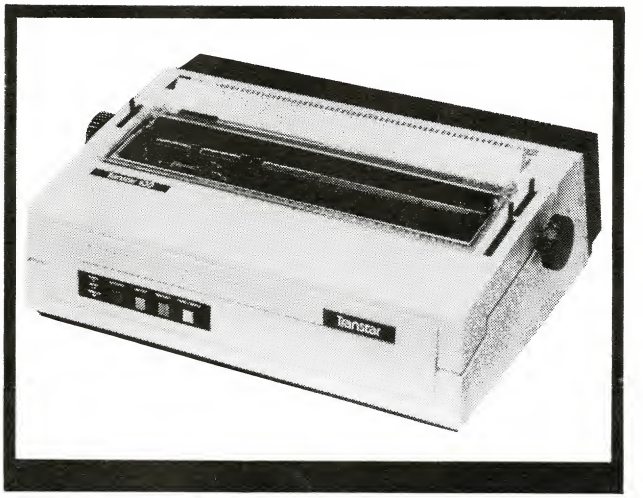
Circle #145 on Reader Service Card

NEW PRODUCTS

TRANSTAR 120 & 130 LETTER QUALITY PRINTER

Lightweight yet durable, the Transtar 120 features bidirectional printing and is fully compatible with the leading word processing packages. Supporting Diablo compatible codes, it can produce superscript, subscript, underlining and a true boldface. It prints quietly at 14 characters per second using a 96 character daisy wheel, up to 121 characters wide. Spacing may be set at 10, 12 and 15 cpi and is capable of 1/120-inch increments. An 'Autoload' button loads single sheet paper to one of four selectable positions. Available in either serial or parallel models, for only $540!

The Transtar 130 daisy wheel printer (pictured to the right), has all of the features of the model 120 and additionally being heavier-duty, printing at 20 characters per second. It also has a wider carriage for a maximum print width of 132 characters as well as true proportional printing. Front panel controls add extra convenience. Both serial and parallel models.

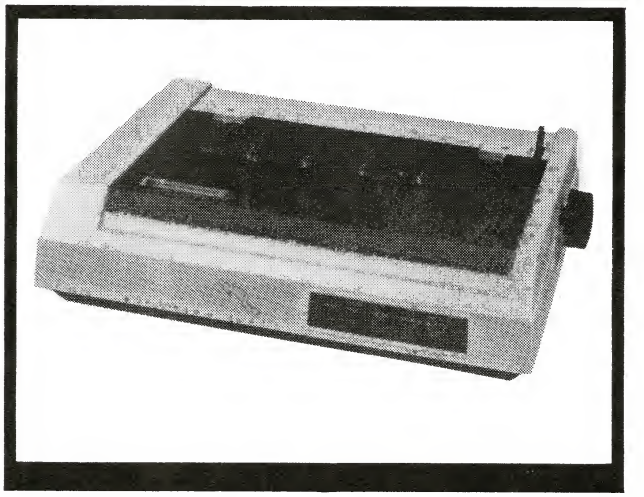


IDS/DATAPRODUCTS PRINTERS

The Microprism 480 dot-matrix printer prints in a Near Letter Quality type font as well as higher speed draft quality. Character pitches are selectable including proportional pitch with a 24 x 9 matrix or 48 x 9 matrix using an enhanced mode. It can also auto-justify text and interfaces directly to Louts 1-2-3. Print speed is 110 characters per second using logic seeking and bidirectional printing as well as dot-addressable graphics of 84 x 84 dots per inch resolution. Also standard is pin-feed and friction feed using a rubber platen and serial/parallel interfaces. Only $469.

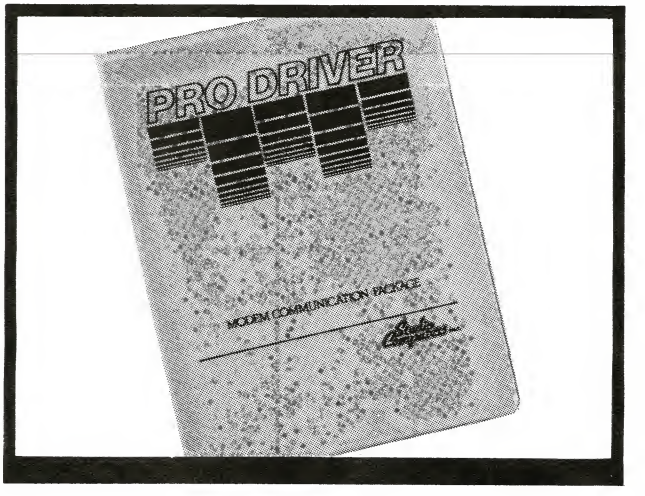
P-80 and P-132

The IDS P-80 and P-132 are high-speed dot-matrix COLOR printers. They interface directly to Lotus 1-2-3 for high resolution color graphic images. The P-80 is an 80 column wide model while the 132 is the wide carriage version featuring print speeds of up to 200 characters per second. Both print using a 24 x 9 matrix and have a 3.4K internal print buffer. Call for current pricing.



PRO DRIVER

A new professional communications package for Z100 computers using ZDOS. Allows you to 'talk' to remote computers using any modem or directly to another computer through a null modem cable. It allows transmitting and receiving of both ASCII and binary files. Clear, uncluttered menu-driven displays makes using Pro Driver a pleasure. Here are just some of Pro Driver's features: Direct support for Hayes Smartmodems, Report Generator for tracking calls made, support of Xmodem, Compuserve B and X/On X/OFF protocols, 32 user-definable auto-logon sequences, printer trace for hardcopy printouts, selectable baud rates from 45 to 19,200 baud, configurable entry and exit colors, cursor modes and keyclick options, Help files and system command usage. With Pro Driver you get a professionally designed package that's simple to operate even for the novice. Packaged with over 200 pages of indexed documentation and pictorial screen displays with major sections organized with tab dividers. Only $49+$2 shipping.



Studio Computers inc.
999 South Adams
Birmingham, MI 48011
Phone (313)-645-5365

ZENITH data systems

For a complete guide to Zenith Computer systems and accessories, request our ALL NEW free 24 page fully illustrated catalog, containing many new products and lower prices. Give us a call or write and ask for the 1984 Spring/Summer edition.

Circle #170 on Reader Service Card

You Can Take It With You: Your Computer in a Low-Tech Environment

Being a bit of a hardware hacker doesn't hurt.

Ray Albrektson

The long-awaited promotion you've been looking for has finally come—and it involves an overseas assignment! But it's in what the papers call the Third World. It's either too dry or too damp and probably too hot. Paris it's not.

Your initial elation is overcome by a sense of panic. "No more Monday-night football! No more Big Macs! Worst of all, *no computer*!"

Not so—you *can* take your computer overseas. But knowing what to anticipate will make it more likely that you will be "up and running" with minimal hassles.

What do you want to take? "All of it, natch!" Probably you should, but what will you need a modem for if there aren't any phones? It is likely that the phones (if any) won't be good enough to handle data transmission. There may not be any other computer users around to talk to anyway! So let's consider what you'll need that you don't have, and figure out what you do have that you probably won't need.

Get ready for 97 volts

Since computers can't live without power, look first at the electricity situation in your destination country. Is it 220 volts A.C. or 110? Many computers and printers have jumpers or switches to run on either. But make sure that all your equipment does. We're fortunate in the Heath/Zenith community since *all* Heath/Zenith computers can switch between 110 and 220. (It's usually a small switch, back near the power supply, probably with a small metal guard to make sure it's not changed accidentally.)

Typically, however, the small things run on 110 only—the power-supply for that outboard disk drive, for example. In this regard, you'd do well to check the specifications for your equipment. Most Heath/Zenith drives are switchable (the '17, '27, '37, and '47). But some aren't—most importantly, the '67 Winchester and the '207 8" drives used with the Z110/120. Among the terminals, the '19, '29, and '49 are okay. But the ZVM121 and '123 monitors and the ZT1, '10, and '11 are 110 volts only.

With printers, too, check the specs. The '14, '25, and Diablo are dual voltage, for instance. The MX-80 from Heath, though, is 110 only.

If, then, any of your equipment is 110 only, consider bringing a good 220/110-volt adjustable transformer to power anything you can't switch to 220.

Be aware that voltage can vary widely. Often, "220 volts" is purely nominal. I live in a city of mixed 110/220, but the voltage at my house as I write is hovering around 97 volts!

I think I am the only person in a country of 20 million who needs 10-hole, hard-sectored, 5" disks.

There are other factors in the power question besides voltage. Such as, does it come and go at odd moments? In most Third-World countries, a line-powered clock (especially a digital one) is *totally* useless. If you go to a country where daily black-outs (randomly timed, of course) are a fact of life, you need to take steps. Like bringing a non-interruptible power supply.

Or you could try adding an S-100 card of CMOS memory with battery backup to your H/Z110 or '120. As with other S-100 products, however, the "S-100" tag doesn't always guarantee the compatibility you need. And these memory boards tend to be expensive. Before you buy one, try to see if someone else has used it on a '100.

You may want to use an all-DC computer for the "down" times. (Until Heath/Zenith offers us one, that means going to models such as the Epson HX-10 or the Radio Shack TRS-80 Model 100.) In any case, be sure to save your work *often*! I have seen ads for word-processing programs that claim to be crash-proof. I would love to have a chance to test those claims! At least when the power comes back, you could continue where you left off!

I use a combination of techniques. I have an NEC (Nippon Electric Company) PC-8901A portable that I routinely use for entering text, programs, etc., and storing it on tape. I get more than 10 hours of use out of one set of nickel-cadmium rechargeable batteries. So my NEC is practically immune to the vagaries of the local Reddy Kilowatt.

I dump the text to my H89 for editing and printing. I try to do this when power is most likely to be stable; but it can still be *very* frustrating.

Finally, when there's no juice for days on end (courtesy of a typhoon, bad transformer, etc.), I drag out a 12 volt DC-to-110 volt AC inverter I got at a flea market and hook up a car battery. Presto! Six hours of 100% dependable operation is guaranteed. The square-wave output of the inverter produces a video display that has a few extra lines, but I can live with it. (Heath used to offer an inverter, but it doesn't seem to have been in the catalogue for quite a while.)

Stock up on supplies

Most computer users go through a surprisingly large amount of consumables in a year—diskettes, computer paper, printer ribbons, etc. Unless you are going to Europe or a major city like Taipei, Nairobi, or Bombay, bring a large stock of everything!

Due to the high cost of ribbon cartridges for my printer (a Diablo 620) I could only bring half a dozen, but I brought six times that many ribbon "pancakes" (the "naked" coils of ribbon) for reloading my own.

The kind of tractor-feed paper you like may not be available overseas; but if you have a single-sheet feeder to go with your printer, you can always survive. (Be

aware that 11" long paper is *not* an international standard!)

When it comes to floppy disks, if you don't use standard 8" or soft-sectored 5" disks, bring a bunch. I think I am the only person in a country of 20 million who needs 10-hole, hard-sectored, 5" disks. (H8 and H/Z89 owners, take note.)

Even if you bring everything you think you will need, you'll want an ally in the U.S. to send you what you forgot. This is strictly an emergency means of support—mails are slow, inaccurate, and subject to pilferage in a large part of the world. A recent CARE package from a computer buddy in the States came full of a kind of black powder—who knows where that stuff came from! Even though it's risky, line up a willing helper who knows all your sources of supply and specifications.

Monsoons and ants

Once you've got power requirements and supplies covered, consider environmental factors. I live in a place where the rainy season dumps 40 inches per month from June to November. But the place I moved from was a dry California desert! My floppy disks soaked up moisture like a thirsty camel. All of a sudden, I found scads of errors in supposedly reliable disks. It got so bad that I had to temporarily de-humidify my California disks and copy them to moisturized disks in order to return to a semblance of reliability. Of course, I just let the California disks soak up the H_2O and then reformatted them, and they worked fine.

The most environmentally sensitive area of the typical computer is the floppy disk system. A missionary I know uses his computer for Bible translation. He switched to DEC tape cartridges because of disk reliability problems, probably a result of the local dustiness.

My floppy disks soaked up moisture like a thirsty camel.

It *might* be a good idea to make your move to hard disk *before* going overseas. Hard-disk systems need microscopically filtered air, anyway; so they come equipped for the job. They may prove far more reliable than floppies in at least some areas that are environmentally difficult. They also eliminate much of the need for non-obtainable disks. But you'll want to match the disk type to the environment. A Winchester may be more susceptible to humidity problems than floppies. And it will take less kindly to bouncing around.

Insects are another environmental hazard to computers. For some reason, bugs like to live in my hardware! The high-voltage power supply of most video terminals can act as a mini bug-zapper, which is tough on the bugs, but is even harder on your equipment. I suggest screening all the ventilation openings in your computer using window-screening, just to keep the critters *out*! Hot-melt glue from a glue gun is a slick and non-permanent way to attach the screening.

In the specification guide for my floppy-disk drive, it says that a piece of dust just a tenth the diameter of a human hair can cause a floppy disk to fail. Imagine what one of those itty-bitty ants would do after crawling down between the disk and its sleeve while looking for a snack. Maybe you would get an error message like: "BDOS Error on A: Smeared Ant."

Why do tiny ants like floppy disks? Maybe only some ants are attracted to disks, or maybe only some disks attract ants. Whatever the answer is, you've gotta keep them out! Consider isolating your disk storage containers on an ant-proof shelf. In some places, they put table legs into little dishes of turpentine to keep ants from crawling up the legs. This method is easily adaptable to ant-proofing your computer desk.

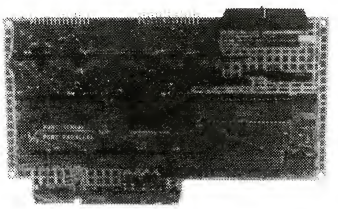
Be prepared!

As I was writing this article, the horror of horrors happened to me. Thunder

H/Z89 PERIPHERALS from **SECURED COMPUTER SYSTEMS**

2/3 PORT SERIAL CARD I/O PORT PARALLEL

" . . . not your typical vanilla-flavored serial and parallel interface . . . "



Features:

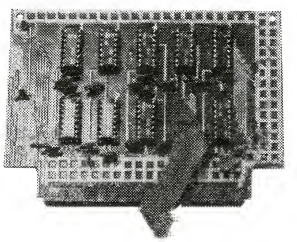
Chip independent design • Reduces computer data buss loading from 3 to 1 • Choice of Centronics or Epson parallel drivers for HDOS or CP/M • Complete documentation and installation instruction

- 2 Serial Ports
- Supports: Ring Input, External Clock, Auto Dialer
- 3 Port Parallel with 2 Level Interrupt Control
- Fully compatible with all models of H/Z 88, 89, 90 using CP/M or HDOS.
- Fully tested, 90 day warranty, two serial cables and a parallel cable (internal to computer) and software driver.

PRICE $199.00
Shipping & Handling $10.00

16K RAM EXPANSION CARD

Expands your H/Z89 RAM Memory capacity to a **FULL 64K!**



Fully compatible with:
H/Z 89 • H/Z 88
Magnolia Microsystems
CP/M and disk drive I/O interface cards

NOW INCLUDING SUPPORT MOUNTING BRACKET

Featuring:
Complete installation instruction • 90 day Warranty
Field reliability record now entering its 21st month

Now Only $65.00

HDOS Is a registered trademark of Heath Company
CP/M is a registered trademark of Digital Research

Shipping & Handling $5.00

PRICES ARE LESS SHIPPING AND TAX IF RESIDENT OF CALIFORNIA
MAIL ORDER: 12011 ACLARE, CERRITOS, CA 90701 (213) 924-6741
TECHNICAL INFO/HELP:
8575 KNOTT AVE., SUITE D, BUENA PARK, CA 90620 (714) 952-3930
Terms and specifications subject to change without notice.

Zenith data systems SERVICE CENTER

Circle #157 on Reader Service Card

Comprehensive Graphics at Practical Prices

Imaginator 2 adds smart graphics to your Heath/ Zenith H/Z-29 terminal. You gain high speed, high resolution graphics with Tektronix® 4010/4014 compatibility standard.

Check these outstanding features:

- ☐ Fast — 500,000 pixel per second vector drawing rate
- ☐ High Resolution — 672 x 500 pixel graphics
- ☐ Standard 1024 x 1024 memory plane
- ☐ Hardware Pan and Zoom
- ☐ Up to 24 pages of graphics memory, 6 standard
- ☐ Instantaneous paging facilitates animation
- ☐ Tektronix® 4010/4014 compatibility with GIN mode, standard
- ☐ High speed graphics character generator
- ☐ Native commands may be directly output from any language
- ☐ Hardcopy directly from terminal via optional port
- ☐ Dual processor architecture for greater efficiency
- ☐ Expandable to full color and/or gray scale

Also ask us about our Imaginator 1 upgrade for H/Z-19 terminals and H/Z-89 computers.

Call or write us today for additional information.

CLEVELAND CODONICS, INC.

18001 Englewood • Cleveland, OH 44130
216/243-1198

Your Z-29 Can Do This...

IMAGINATOR

Circle #112 on Reader Service Card

Tektronix® Registered trademark of Tektronix, Inc.
Codonics and Imaginator are trademarks of Cleveland Codonics, Inc.

crashed nearby, and my screen turned to garbage. Worse, when I attempted to reset, no system prompt resulted! I suddenly felt very much alone. The nearest Heath service center seemed as far away as the moon.

Crossing my fingers, I switched the power off, then on, and Gloriosky! The H: came back! That episode illustrated the need to be ready to deal with hardware failures.

The time is *now* to figure out what you will do if your system blows a chip in Timbuctoo. The bare essentials would be a set of schematics, a good multimeter and soldering iron, and a digital logic probe. If you built your computer from a kit, of course, you should already have these. If not, you can get them through Heath/Zenith.

Some computers offer the user more diagnostic tests than others. Try to dig up whatever check-out software you can, especially disk-drive analyzers and programs to check out random-access memory (RAM). For Z110/120 owners, TEST is included in the read-only memory (ROM). For '89 owners, there is also a memory test in ROM. And there was a program included in the construction manual for the '8. Additionally, there are a number of good programs on various bulletin boards.

Take along a couple of spare RAM chips. If you have had a specific problem in the past that may reoccur, bring what you'll need. I'd popped two keyboard encoder chips on my '89 in the States, so I made sure I had a spare when I went overseas.

Since disks are the Achilles' heel of most systems, invest some money in the service manuals for your drives. And lay in a stock of whatever solvents or lubricants you will need to give them periodic maintenance. Decide whether you believe in head-cleaning diskettes and, if you do, get one before you go. And don't wait until you're all settled in Ulan Bator before discovering that you need a set of spline wrenches to work on the drives! You would have better luck finding yak butter in Kalamazoo.

As you might guess, kit builders have something of an advantage when moving outside the U.S. They should already have the manuals and supplies that are essential out here. That provides, though, a fringe benefit to those of you who bought your computers assembled: you won't have any difficulty in finding where parts and supplies can be obtained through the mail. Carry that Heathkit catalogue with you. Hope that you'll never have to rely on the mails. But if you ever have to, it's somewhat comforting to be dealing with a company that's used to users' mail-ordering everything from single chips to whole systems.

There will always be limits, of course. And being far away will always impose its costs. You won't, for instance, be able to get any detailed technical information on the power supply for the Z110/120. The engineers just figured it was too complex (and dangerous!) for the end user to mess with. (One Heath loyalist suggested a solution for Z100 owners who were moving overseas: it was obviously time for them to "move up" to an H8!)

Pack it up

Now to pack it all up! Moving is a complex business—and I include the legal ramifications. With some movers, if you pack it, you're responsible for damage. But can you trust the movers to pack it reliably? Even if they do it and there is damage, can you collect, much less get on line as soon as you would like? Before moving day, you should have carefully investigated the mover's liability for loss or damage—you might need supplemental coverage.

After a number of moves, I feel that the best approach is to plan the packing of your computer yourself, but let the movers actually pack it. If you have the original boxes for computer, video display, etc., so much the better. If not, scout TV and appliance stores for big strong boxes and foam packaging inserts that you can modify to fit your gear.

Get big plastic bags (like extra-strength garbage bags) for putting a dust- and moisture-proof shield around each major item before it goes in its foam-padded box. Make sure you can pack everything in double-strength cardboard boxes with at least 6" of foam padding all around.

On moving day, show the packers what you've got and see if they like what they see. Then let *them* pack it. And when it is put into the container (or crated), be sure that it is not used as a handy foundation for the washing machine to go on. On the other hand, put it in the back of the container or center of the crate for security and customs reasons.

Packing and moving software is a different story. My favorite method is to put my disks in disk boxes in groups of 10 or 12, and have them shrink-wrapped. This makes them practically dust and water proof. Try to find a store that will do it for you as a favor—record stores usually have a shrink-wrapping machine. By all means, hand-carry a backup set of disks of your key programs or records in your personal luggage. Protect them the same way.

(You might also want to take a look at *Sextant* #2, Summer 1982. It has an article in it by David J. Esche, "What to Do with Your H88/89 After the Movers Have Finished Playing Soccer and Dropsy with It.")

Remember, too, that some computer equipment has its own special hazards. Winchesters intensely dislike being

EPSON

GRAPHICS

for

H89 and H100

Our *CALLIGRAPHY* program package for the *EPSON* printer can combine dot graphics images from disk files and standard text to create custom graphics for advertisements (such as this ad), letter heads title pages and much more!

The set of programs includes a screen character editor, a program to print text and graphics and a starter set of alphabets, pictures and borders. The H89 version requires CP/M and the H100 version operates under CP/M-85. When ordering, please specify computer, disk format and memory size. Price of package, including 60 page manual with tutorial, is 49.95 (Calif. residents add tax).

Expand the disk library by adding *FONT SET 2.* 14.95 when ordered with the *CALLIGRAPHY* package. Additional font sets are 19.95 ordered separately.

Write for more information or call our evening customer service number (415) 254-3931.

SKYCASTLE

Computer Products

P.O. BOX 1412 SAN CARLOS, CA 94070

Circle #218 on Reader Service Card

bounced around, for instance. Fortunately, some Winchesters are supplied with a program, such as SHIP, to make life a bit easier. It won't absolutely prevent damage; but it positions the heads so that damage is less disastrous than it might be.

As a final line of defense for your software, carry a hard-copy list of all your software vendors and the serial numbers of your software. If all else fails, registered owners can (usually) get replacement copies for a reasonable fee. (You did send in all those registration letters, didn't you?)

And watch the paperwork

Getting your shipment out of the greedy grip of customs at the other end requires some advance planning. In *most* countries, the customs agents exist for purposes other than hassling individuals moving to their countries. But plan for the worst.

You will need an inventory of your shipment to clear most customs agencies. I suggest having on tap two inventories—one very specific and detailed, and one that is very general. In the specific one, list *everything*, complete with model and serial numbers. Itemize software, hardware, and accessories in minute detail and include information on condition. The movers may have done an inventory as they packed—do your own at the same time! The general inventory should list only major categories, for example:

Kitchen goods, boxes 4, 2, 6
Office equipment, boxes 1, 5, 9
Bedroom goods, boxes 8, 7, 3, etc.

It is the general inventory that seems to work best with customs. If they ask what is in the boxes of "office equipment," tell them, of course; but it is generally best to volunteer as little information as possible. Sometimes, the very word "computer" does not communicate with people who have no idea that an individual person can own one. Avoid it if at all possible. Putting that word on the inventory can cause a ludicrous valuation to be put on your shipment—$20,000 for an H8? If you use it for word processing, the phrase "electronic typewriter equipment" is much safer and more understandable.

Finally, we need to talk about security from theft. In many Third-World countries, Americans are an attractive target for burglars. We are traditionally the most gadget-oriented of peoples, and a burglar can expect a rich haul of cameras, stereo goodies, microwave ovens, etc. You can be sure that burglars will be delighted to have your computer system as a bonus, even if they mistake it for a fancy video game! The best approach to security takes four steps.

First, avoid ostentation in the rooms that people can see. That means hide the TV and stereo in cabinets or rooms where they won't be easily seen.

Second, either keep the place occupied or simulate occupancy very well! I don't mean just when you're away on trips, but even when you go to the market for an hour.

Third, use security devices such as good-grade locks, security bars, and burglar alarms. Some local locks may have cheap brass shackles that can be clipped or filed in minutes. A very rugged-looking lock with "HARDENED" stamped on the "steel" shackle turned out to be soft brass, and easy prey for my Swiss army knife.

Many window bars are simply bolted in place—have the heads welded to the bar frame. Use multiple alarms—perimeter alarms for the windows and doors, and a back-up anti-tamper alarm on the high-value goodies.

Finally, the last line of defense is immobilizing your gear. Put heavy bolts through the bottom chassis of your computer into a heavy metal or wood desk-top, and the same with the printer. No matter how attractive your stuff is to burglars, it will take them a good long time to figure out how to unbolt it. Hopefully, they will take the rest of the stuff and go!

Is it worth it taking your computer with you overseas? Only you can decide—it will probably be a hassle, but it is possible! With the right attitude, it can even be fun!

Controlled Data Recording Systems Inc.

AVAILABLE NOW THE FDC-H8

DOUBLE DENSITY 8" AND 5.25" CONTROLLER FOR THE H8 COMPUTER

Has all of the capabilities of our popular FDC-880H controller, with the added features of;

- Direct memory access (DMA) data transfer.
- Hard sectored controller (H17) incorporated on the board.
- Runs with the standard 8080 CPU card and with Z80 CPU upgrades.
- Accesses both hard sectored disk formats and soft sectored disk formats through the same drives attatched to the FDC-H8 without hardware additions. **Price $495.00**

NEW PRODUCTS FOR THE FDC-880H

DM-1 DUAL BOARD MODIFICATION KIT **$29.95**
Allows for both the FDC-880H and the H88-4 controller cards to interface with the same 5.25" drives. Drives will run as both hard sectored format and soft sectored format depending upon the logical drive letter.

CDR BIOS by Livingston Logic Labs **$60.00**
Enhanced version of Heath/Zenith CP/M 2.203 BIOS with ZCPR. Supports all Heath/Zenith disk formats through the FDC-880H and the H17 controllers.

CDR DVD by Livingston Logic Labs. **$50.00**
HDOS driver for running double density HDOS through the FDC-880H

Shugart Slimline 5.25" 40 track double sided drives **$275.00**

Shugart Slimline 8" double sided drives **$525.00**

5-20 day delivery–pay by check, C.O.D., Visa, or M/C

Contact: **C.D.R. Systems Inc.**
7210 Clairemont Mesa Blvd., San Diego CA 92111
Telephone: (619) 560-1272

Circle #110 on Reader Service Card

DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES

PRICE BREAKTHROUGH

Super Sale on New Disk Drives

Starting at **$169.00!** New Low Price

Tandon — Siemens — Remex — MPI — Teac — Shugart — Tabor

40 or 80 Tracks — Single or Dual Head — New 3½'' Drivette ™
Our Disk Drives are Capable of Single **and** Dual Density Operation
The **NEWEST** Technology Capable of Operating on Most Popular Computers
Drive a Hard Bargain!! ™ For your TRS/80, Color Computer, IBM, Apple, Franklin, Max/80, 5 M.B.-20 M.B. Complete Systems.....from $999.95

Diskette Breakthrough — 10 Pack in Library Case — ~~$18.95~~ NEW LOW PRICE

PLEASE CALL FOR OUR MOST CURRENT PRICE REDUCTIONS.

TOLL FREE ORDERING
1-800-343-8841

GENERAL AND TECHNICAL
1-617-872-9090

Disk Drives (0123) TRS/80-IBM-Apple-TI-Franklin-Max/80-LNW ◄
Model I/III/IV Upgrade (Disk Drives - Memory) ◄
Printers—Daisywheel/Dot Matrix ◄
Percom Double Density Controller (Model I) ◄
Color Computer Printer Interfaces ◄
Disk Drive Operating Systems ◄
Repair Services Now Offered—FAST Turn-a-Round ◄
Apple/Franklin Compatible Add-On Drives with Case & Cable ◄
Diskettes in Library Cases ◄
DISK DRIVE CASES AND POWER SUPPLIES ◄
Printer **Buffers 8K to 512K** ..... **starting at $143.95**
Holmes Model I/III Speed-up Mod ..... **starting at $90.00**
Cables—Printer/Disk Drive ..... **starting at $16.00**

CALL TOLL FREE FOR NEW PRICES

Warranty on Disk Drives — 1 Full Year Parts and Labor

SOFTWARE SUPPORT, INC.

271 Worcester Road, Framingham, MA 01701 (617) 872-9090 Telex-383425
Hours: Mon. thru Fri. 9:30 am to 5:30 (E.S.T.) Sat. 10 am to 4:30 pm

DEALER INQUIRIES INVITED.

TERMS:
M.C./Visa/Amex and personal checks accepted at no extra charge.
C.O.D., please add $3.00.
Shipping: Please call for amount.
Not responsible for typographical errors.
Prices subject to change.

CANADA
MICRO R.G.S. INC.
751, CARRE VICTORIA, SUITE 403
MONTREAL, QUEBEC, CANADA, H2Y 2J3'
Regular **Tel. (514) 287-1563**
Canadian Toll Free 800-361-5155

Service! Service!

All in stock products are shipped within 24 hours of order. Repair/Warranty service is performed within 24 hours of receipt unless otherwise noted. We accept C.O.D., foreign and APO orders. School and D&B corporate P.O.s accepted.

TRS/80 Registered Trademark Tandy Corp. Apple Registered Trademark Apple Computer Corp
IBM-PC Registered IBM Corp. Franklin Registered Trademark Franklin Corp. Max/80 Registered Trademark Lobo Int.
LDOS Reg. Logical System Inc. Dosplus - Micro Systems Software Newdos/80 - Apparat Inc.

DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES

Circle #164 on Reader Service Card

Dual Speed on Your '89

With software-selectable 2-MHz or 4-MHz operation, you can take advantage of higher processing speed without having to sacrifice any programs dependent upon slower operation.

Alan K. Gideon

Heath/Zenith's H/Z89 computer was designed with the hobbyist in mind. Whether we build the '89 from a kit, or purchase it assembled, we quickly start adding on. We add additional disk-controller cards, add external drives, add those extra little touches to the operating system that fulfill our individual needs, ... and then realize that we are spending too much time staring at the screen, waiting for the machine to finish "thinking."

If, like me, you get tired of waiting for your editor to find the end of the file (or for even your best sort routine to complete the latest revision to your favorite charity's mailing list), there is hope. No, I don't mean buying a new machine. I'm referring to the idea of doubling the frequency of the system clock in your venerable friend from 2 megahertz to 4 MHz.

Several schemes, with various hardware and software solutions, have arisen to perform this task. *REMark*, the national Heath Users' Group magazine, has published one technique by Pat Swayne (issue #34, November 1982). And there are at least three commercial products on the market (from Extended Technology Systems, Kres Engineering, and Najay Systems).

As I began to survey the different solutions, I realized how quickly my machine had become quite complicated, and how sophisticated the answer would have to be. The H17 disk-controller board, for instance, will only operate at 2 MHz. So some input/output (I/O) functions won't work properly if the central-processor unit (CPU) is speeded up to 4 MHz. Which means that you have to add wait states to let the CPU twiddle its thumbs while it's talking to the disk controller.

Also, some of these 4 MHz schemes use the general-purpose I/O port (362 octal). What if you need this port for any other project?

Just as these questions began to frustrate me, I found Kres Engineering's Dual Speed Module, the DSM-240. It turns out that the DSM-240 can be booted at either 2 or 4 MHz, wait states can be added as required, and it decodes its own port (74 hexadecimal). At that point, I decided on the DSM-240.

The good news

It works. Beautifully.

Ahh, you want more than a testimonial. Before you fork over your money, you want specifics. Okay, here goes. The package comes as a very well done, fully populated circuit board; a small DIP jumper cable; and a floppy disk with the required changes to the operating system. Versions are available for both the Heath Disk Operating System (HDOS) and CP/M, with source code. It also has an extremely well written 56-page manual.

The Kres parts were protected within their shipping container by three-quarter-inch-thick foam; and the floppy and instruction manual were individually sealed. You'll be removing some integrated-circuit (IC) chips from your '89 and may want to use them later for something else. Kres's *pièce de rêsistance* is a section of conductive foam to protect them from static electricity. Nice touch.

Hardware and installation

The Kres circuit board is L-shaped, approximately three inches along each leg. It contains a Z80A CPU, a pair of programmable array logic (PAL) chips, and a 2/4 MHz clock circuit.

Onboard jumpers allow the user to set: (1) the use of zero or two wait states for I/O operations (not for reading or writing to memory); (2) the desired data bus speed; and (3) the processor speed at boot. All of these functions are independent; processor speed is software controllable. At the risk of repeating myself, the board is very nicely done. The foil tracings are solder

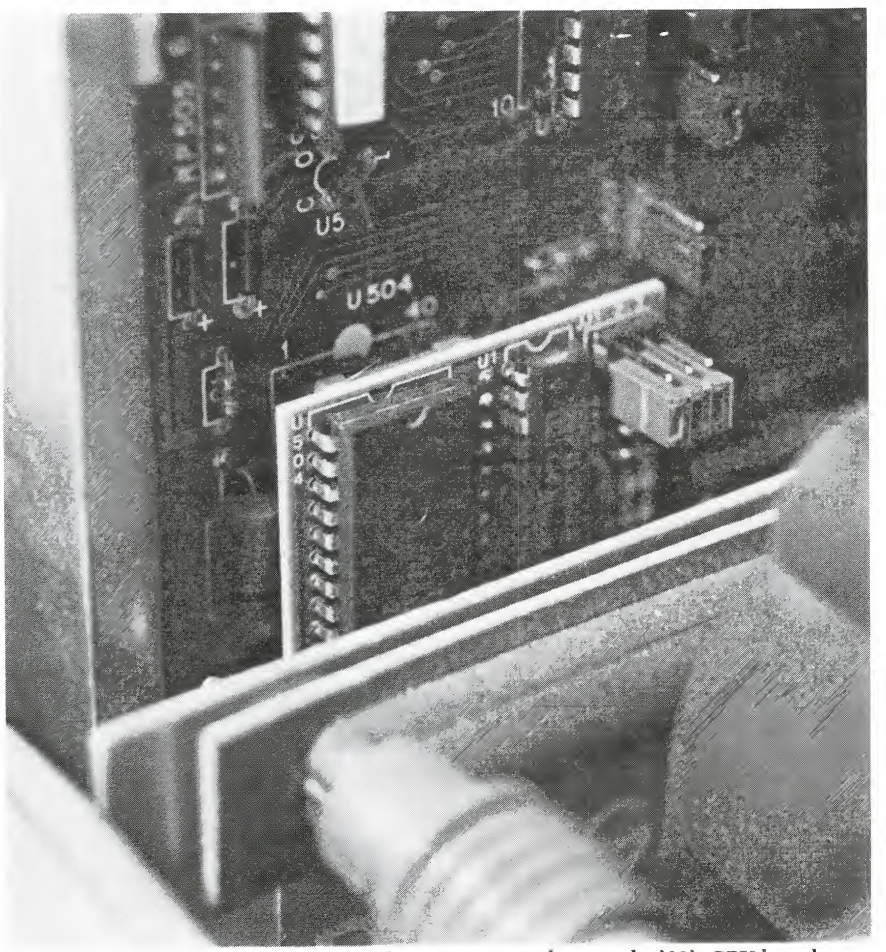


Photo courtesy of Kres Engineering

The DSM-240 from Kres Engineering plugs into two sockets on the '89's CPU board.

masked. And all of the connectors and jumpers are gold plated. The documentation indicates that tolerances were held to well within the specs required for the '89's Z80A CPU chip.

The biggest part of installation probably is removing any accessory cards from the CPU board, and the CPU board from the machine. So the difficulty of the entire job will depend on how many add-ons you already have installed. After a few of these, it can become a challenge to keep track of what goes where so that you can put things back together. But after I removed the CPU board, the actual installation of the DSM-240 took literally less than five minutes.

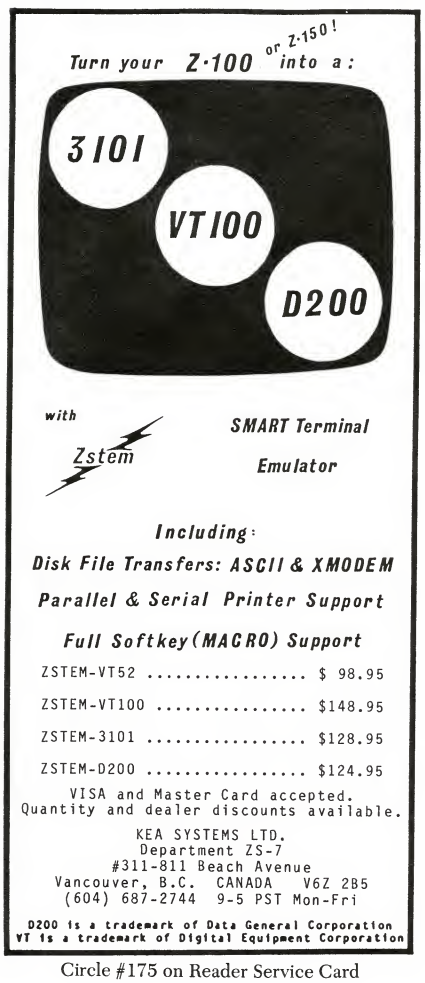
You pull three ICs, including the Z80, and plug the DSM-240 into two of the empty sockets and the DIP jumper cable into the third. Put everything back that you pulled out of the cabinet, and you're done.

To give you some idea of my hardware skills, by the way, I assembled my H89A in forty hours. (Read each instruction twice, do the step, read it again just to make sure.) And I've added the HA-88-3 serial interface card, the controller board for the H/Z37 disk drive, and a third-party expansion board to bring my '89 up to 64 kilobytes of random-access memory (RAM).

I must point out that even when compared to the high standards of clarity and detail that Heathkit has set for assembling electronic equipment, the Kres people have done an outstanding job. The instructions are quite orderly and there are plenty of assembly drawings to keep you from guessing.

When Kres tells you what to do, they also tell you why you're doing it. This should give more confidence to the person who is not too familiar with hardware and software modifications. For instance, the Z80 chip, when removed from the CPU board, is sensitive to static electricity. Kres warns you that this step is coming up, tells you how to avoid trouble, and then warns you in boldface print just before you remove the chip. It would appear that they are trying to minimize your problems, and theirs, too.

After the hardware installation is completed, the user is given the chance to run a 12-byte program to test the random-access memory (RAM). This program, MEMTEST.COM, is based on the public-domain "worm" program. It crawls its way through memory, leaving a trail of hexadecimal FFs behind. MEMTEST can be run at either 2 or 4 MHz to isolate any problem that might arise.



Circle #175 on Reader Service Card

Software and installation

Software support for the DSM-240 is supplied in versions for use under either HDOS or CP/M. If both operating systems are required, there is an extra charge of $10.

Both HDOS and CP/M systems come with the programs SETCLK and SETCLK17 in .ASM source code and in ready-to-run .ABS/.COM form. These programs are used to toggle the CPU speed back and forth between 2 and 4 MHz while running.

The software installation instructions are given in two forms: a brief outline and a detailed explanation. The detailed explanation should be adequate for you even if you have very little experience in modifying any operating system. (In which case, in fact, you may still be reeling from Zenith's instructions on how to initially get the operating system to talk to all of your hardware.) In addition to explaining how to make the specific changes necessary, Kres explains commands like PIP and DIR the way they *should* have been explained.

As supplied by Kres, the Basic Input/Output System (BIOS) for CP/M is basically the standard Heath product with timing-constant modifications to allow the H17 controller to run at 2 MHz while the CPU runs at either 2 or 4 MHz. Kres supplies a modified Heath BIOS.ASM; you get four ready-to-run versions that have already been run through MAKEBIOS. There's one for each of the most common disk-drive combinations: H17 alone; '17 and '37; '17 and '47; and '17 and '67.

If you are still using the standard BIOS for CP/M, you will run MOVCPM and write one of the four "pre-digested" BIOSs mentioned above to the system tracks of a host diskette. If you have modified the standard BIOS (for example, to include a replacement printer driver), you will have to start with the Kres BIOS.ASM, make any required changes, work your way through MAKEBIOS, and then proceed to the Kres instructions.

Kres also gives rather good instructions on how to proceed if you have installed other, related, third-party disk controller cards and/or monitor read-only memory (ROM) chips. An interesting sidelight is a product-by-product discussion of these items, which could help users decide which ones are best for their own needs. C.D.R. Systems, Livingston Logic Labs, Magnolia Microsystems, D-G Electronic Developments, and UltiMeth Corporation products are discussed in a level, non-judgmental manner. (If you have Magnolia's CP/M, Kres also offers patches to it so that you can use it with their board.)

HDOS modifications come in the form of mount/dismount routines (in both .ASM and .ABS forms) and PROLOGUE.SYS files for HDOS to execute upon bootup.

If you are an HDOS user, you need to arm yourself with a knowledge of your version number, the type of boot-drive controller used, and the type of H17 driver in use, if any. After that, installation is a simple matter of following the right path through the instructions. A variety of mount and dismount programs are included, depending on whether you choose to boot at 2 or 4 MHz and whether an H17 controller is installed.

After modifying the operating system software, your "task" is to play with the system and familiarize yourself with how it can best be used. There don't appear to be any hidden "bombs" to trap the unwary, and Kres encourages experimentation.

Not all software will operate at 4 MHz. And some may need to be patched in order to do so. Games, modem-control packages, and other programs that use timing loops will need to be tested. Some software suppliers may be able to provide registered owners with adequate information for patching their code if the CPU speed affects program operation. But you shouldn't count on it.

Also, one or more of your '89's I/O boards may require that wait states be inserted in their dialogue with the CPU board. This should cause no major difference in the net speed increase you will experience in going to 4 MHz. If a program is very CPU-intensive, I/O wait states never come into play. And if a

SEXTANT The Independent Magazine for the Entire Zenith Computer Community

Yes! I want to start my subscription to *Sextant* right away!

Enter my subscription for:
☐ 12 issues (2 years) for $29.91 ($34.50 to Canada)
☐ 6 issues (1 year) for $14.97 ($17.25 to Canada; $21.00 overseas via surface mail, $34.50 via air mail)

Payment terms:
☐ Payment enclosed (checks must be in U.S. dollars payable on a U.S. bank.)
☐ Bill me
☐ Charge my: ☐ Visa ☐ MasterCard

Card # _____

Expiration date ____ MC code # ____

Name _____

Address _____

_____

_____

We'll start your subscription with Issue #13 (November-December 1984), unless you request otherwise.

S12-S

SEXTANT The Independent Magazine for the Entire Zenith Computer Community

Yes! I want to start my subscription to *Sextant* right away!

Enter my subscription for:
☐ 12 issues (2 years) for $29.91 ($34.50 to Canada)
☐ 6 issues (1 year) for $14.97 ($17.25 to Canada; $21.00 overseas via surface mail, $34.50 via air mail)

Payment terms:
☐ Payment enclosed (checks must be in U.S. dollars payable on a U.S. bank.)
☐ Bill me
☐ Charge my: ☐ Visa ☐ MasterCard

Card # _____

Expiration date ____ MC code # ____

Name _____

Address _____

_____

_____

We'll start your subscription with Issue #13 (November-December 1984), unless you request otherwise.

S12-S

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 13098 WASHINGTON, D.C.

POSTAGE WILL BE PAID BY ADDRESSEE

BUSS/SEXTANT
FULFILLMENT DEPARTMENT
716 E Street S.E.
Washington, DC 20003

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 13098 WASHINGTON, D.C.

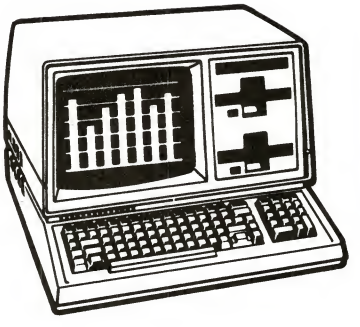
POSTAGE WILL BE PAID BY ADDRESSEE

BUSS/SEXTANT
FULFILLMENT DEPARTMENT
716 E Street S.E.
Washington, DC 20003

Heath/Zenith Users— Get the Most From Your Computer:

Read the only independent magazine devoted to your system—

SEXTANT the Independent Magazine for the Entire Zenith Computer Community.



Whether you use an **H/Z100, H/Z89, Z90, H88, or H8**—you'll find articles in every issue which apply to your system.

Explore **CP/M, HDOS,** and **Z-DOS** capabilities through *Sextant*'s articles. Applications, programs, compatible hardware and software, and the latest developments in the Heath/Zenith community are among the topics included in *Sextant* on a regular basis.

Carefully edited to bring you a broad coverage of the Heath/Zenith community, *Sextant* features include:

- A broad range of "**how-to**" **articles** which will help you implement system enhancements as you need them. Read about how other users have altered their systems to suit their needs—and how you can do the same.
- **Reviews of products** from Zenith and independent suppliers will help you sort out the questions you have about hardware and software options you might consider.
- **Short program listings**, including utility programs and games, give you practical options which you can implement immediately.
- For your system needs, you'll find a variety of **compatible product advertisements** in each issue of *Sextant.* Many advertisers find the independent magazine for the entire Zenith computer community the most direct medium to market their Heath/Zenith-specific products—you'll find independent suppliers with products you won't find advertised elsewhere.
- And, so that you'll be informed of the latest progress and innovations in *your* Heath/Zenith community, *Sextant* provides extensive **coverage of community affairs.** Read about major events in the Heath/Zenith community, as Heath/Zenith users meet to discuss recent developments and future projections. Specific companies and individuals are highlighted as they make significant contributions to the Heath/Zenith community.

Discover information that can help you get the most from your system!

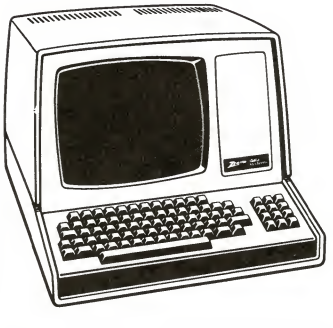
Start your subscription today!

Call Toll Free: DATATEL™ **800/341–1522** (M–F 8 a.m.–9 p.m. Eastern Time)

Or mail the coupon below to:

Sextant, Dept. S12, 716 E Street S.E., Washington DC 20003 • 202/544–0900

Please allow 6 to 8 weeks for delivery of your first issue.



Your satisfaction with Sextant *is guaranteed. If at any time you're not completely satisfied just let us know and your money will be refunded—even for the issues you've already received.*

Send me:

- ☐ **12 issues for $29.91 ($34.50 to Canada)**
- ☐ **6 issues (1 year) for $14.97 ($17.25 to Canada; $21.00 overseas via surface mail, $34.00 via air mail)**
- ☐ Payment enclosed (Checks must be in U.S. dollars payable on a U.S. bank.)
- ☐ Bill me
- ☐ Charge my: ☐ Visa ☐ MasterCard

Card # _____ Expires _____

Name _____

Address _____

_____

_____

Sextant, Dept. S12, 716 E Street S.E., Washington DC 20003

Possible Weak Points

I believe it's safe to say that no computer can have its computational speed doubled simply by plugging in one new module, regardless of who designed the module. When the computer was first created, certain factors were given as baseline facts. This included the CPU speed. From that speed, the engineers calculated the required access speed of the RAM chips, the response of the boot ROM, and the interfaces with other sections of the computer.

When the CPU speed is doubled, these relationships and their implied "factors of safety" need to be re-examined. I'm bringing this up because no one likes to charge off on an exciting project and then have it bog down due to unexpected costs. As with anything else, it pays to consider all factors.

So here is a list of potential "alligators" that may live in the swamp of experimentation.

U526-U549 (4116 chips used in RAM and in the RAM expansion board)—(There are 32 of these in a 64K machine.) The 250-nanosecond chips supplied by Heath are theoretically okay. But since a problem here doesn't always announce itself, I upgraded to 150ns chips just to be on the safe side. Kres includes a list of manufacturers' part numbers and access times for those users who don't have an IC selection guide.

U562 (74S132 logic chip)—This must be a 74S132 (Heath # 443-901), not the older 74LS132 (443-792). My H89A came with the newer part.

U253, U255 (2114 chips used in RAM to buffer the floppy-disk drive)—Heath/Zenith didn't choose these static-RAM chips for 4 MHz usage. But since they don't normally create hidden problems, I kept mine and have had no hassle.

U561 (An 8250B asynchronous communications element—ACE)—Communicates with the terminal logic board. If it doesn't work at 4 MHz, a temporary fix is to use the wait-state jumper on the Kres board to throw in two wait states. Or you can try swapping the 8250B with an unused one on the serial board (U602-U604).

U516-U518, U550 (Monitor ROM chips)—MTR-88, -89, and -90 chips are generally not fast enough, though chances are better with MTR-90. None of them will boot the H17 at 4 MHz. C.D.R., Kres, and UltiMeth have products to do that. For $59.95, Kres sells a modified UltiMeth ROM. If you need to intercept the boot process before its completion, this ROM allows a boot at a speed other than the one you set the jumper on the board for. Or, you can boot at 2 MHz and have SETCLK or SETCLK17 run as a cold-boot autorun from CONFIGUR in CP/M or as a PROLOGUE.SYS file in HDOS.

U610 (74LS74 flip-flop used on H88-3 serial board)—Pat Swayne of HUG says it may be necessary (on H88-3) to bypass this. (You would remove it; then put in jumpers between pins 2 and 5 of U610, and between U601 pin 5 and U610 pin 8.) I haven't had to try this technique.

U602-U604 (8250B ACE used on H88-3 serial board)—One of these may need to be replaced if it cannot support 4 MHz. You can try swapping it with one in an unused channel.

program spends most of its time reading from and writing to the disk, it will not be affected too much by the processor speed. The drive's rotational speed will be the important factor there.

Kres warns that in spite of all that a person might do, some hardware and software *will not* operate at 4 MHz. Unfortunately, you only find out by trying. Regarding the IC chips you already have, you might want to take a look at "Possible Weak Points," which accompanies this article. It will give you an idea of which chips might be sensitive to the faster speed—and how to handle them.

Although it pays to be cautious, I haven't had any trouble so far. If your experience is like mine, the main thing you'll notice will be your '89's speed increase.

Ordering Information

DSM-240 Dual Speed Module for H/Z89, $99.97
Price includes software support for CP/M or HDOS (available on 5¼", 48 track per inch, single side; hard-sectored 5¼"; and 8" single-side/single-density). Add $10 for a second operating system. Shipping and handling for DSM-240 and operating-system support, $3.50.
PMM-300 CP/M Plus support, $49.95
KMR-100 Modified UltiMeth ROM, $59.95
PMM-100 patches to Magnolia Microsystems CP/M, $49.95
Kres Engineering
P.O. Box 17328
Irvine, CA 92713
For information or orders: 818/957-6322
Bulletin board: 714/559-8579
COD orders may be made by voice or by leaving a message on the RCPM bulletin board. COD charges by UPS apply.

The Original MP/M-86 for the Z-100
is now
Z-100 Dual Processor MP/M 8/16

There is only one field-proven MP/M-86 for the Z-100 which has been shipping since October, 1983. Now the original MP/M-86 for the Z-100 supports up to 9 users running mixed 8 AND 16 bit software at the same time, totally transparent to the users.

For more information on this highly versatile system, write or phone:

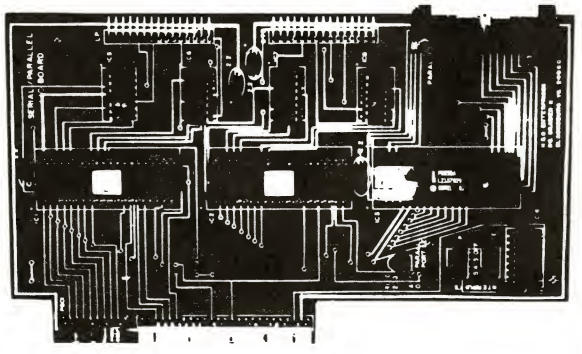
Barry A. Watzman
560 Sunset Rd.
Benton Harbor, MI 49022

616/925-3136

MP/M and MP/M-86 are trademarks of Digital Research, Inc.
Z-100 is a trademark of Zenith Data Systems, Inc.

Circle #206 on Reader Service Card

THE ORIGINAL SERIAL/PARALLEL INTERFACE BOARD



I/O Board
Replace the H88-3 to upgrade your system or use the KC 1222 in place of it! Providing the two standard serial ports PLUS three parallel ports on one card, you have the best of both worlds! Use the parallel ports for printers, joystick, intrumentation/controll...KC 1222 has components including cables and hardware. KP 1222 has the same items less the serial chips and serial cables.

KC 1222 Complete Kit	$128
KP 1222 Parallell Kit	97
PC 1222 Bareboard	48.50

Printer Drivers
The C. Itoh, Epson, Okidatas, Gemini and others are supported under HDOS and Heath's CP/M $20
Magnolia Patch $10

Printer Packages
Our printer packages are fully checked out and set up for your system. All you need to do is plug it in and start using it! No more fussing with switch settings, making cables . . . the aggravation is gone! The package includes cable, assembled and tested, set up printer and your choice of HDOS or CP/M software.

Dot Matrix Packages Include Cable and Software
Gemini 10x $350
Prowriter 8510AP 395
NEW Prowriter 8510 SP (180cps) 595
NEW Prowriter 8510 BPI (IBM compatable) 480
NEW Prowriter 8510 scp (color 180 cps) 690

Daiseywheel Packages Include Cable And Software
Silver Reed EXP 500 $500
Silver Reed EXP 550 720
NEW Silver Reed 400 395
C. Itoh A10-20 595
TTX 1014 550

Z-100/Z-150 Folks: Subtract $20 . . . you don't need the software!

ZDS HARDWARE • PRINTER PACKAGES • SOFTWARE

MATHGEN: The keyboard math interpreter brings mathematics to life! Function roots, max and min. evaluate function integrals and first derivatives, hyperbolics, exponential forms, logs, trig functions, factorials, the list goes on! Define the functions from a file, batch processing style, or from the keyboard. Plot to the screen or your printer. CP/M or HDOS for only $40.00. Now for Z-Dos, too!

DATAPLOT: Using the dot addressable graphics of your Prowriter, plot any definable math function in single or double density. Select axis size and scale, plotting quadrant, etc. Generate your data by MATHGEN, MBASIC or any other language. CP/M or HDOS for $25.00.

PRN: A printer utility for the Prowriter, Epsons, and H14. Print headers, footers, pause at page end, print multiple copies, left margin, printer mode and a host of other functions. CP/M or HDOS for $25.00.

JS: Use your parallel ports for REAL TIME joysticks! Use up to four at a time with your favorite MBASIC or machine language keyboard game for HDOS. Program the response speed of the sticks, key sequence for different games. etc. Uses Atari joysticks. Only $25.00

We fully support all of our independent-vendor products. If you have a question, we will **never** refer you to someone else.

NEW PRODUCTS

MODEMS	
Anchor Signalman Mark I	$95
Anchor Signalman Mark XII	$350
Novation D-Cat	$189
Novation Smart-Cat 103/212	$550
Volksmoden	$75

SURGE SUPPRESSORS	
EPD: "Lime"	$79
EPD: "Orange"	120
Panamax SS4LCS	95
Panamax Maxi Strip	35

BUFFERS	
TTX 16K	$160
TTX 64K	250
Quadram 16K	175

SWEET P PLOTTER	$695

As authorized ZDS dealers, we support the Heath/Zenith community with competitive prices and post sales support. Contact us for price and delivery on the Z system and accessories of your dreams.

VA residents add 4% tax. All of our products are shipped postpaid in the continental U.S. Otherwise, please add 5% for shipping. Foreign orders in U.S. dollars or drawn on a U.S. bank. Also include customs house and address.

Group purchase discounts are available-contact us for details.

H & H Computer Enterprises, Inc.
P.O. Drawer H Blacksburg, VA 24060
(703) 552-0599

Circle #123 on Reader Service Card

(LISP) for H89

Artificial Intelligence Language
UO-LISP Programming Environment
The Powerful Implementation of LISP for MICRO COMPUTERS

Excellent for developing A.I., ROBOTIC, EXPERT and INTELLIGENT SYSTEMS

The usual **LISP** Interpreter Functions Data Types, Structure Editor, Screen Editor with Mouse Support, Optimizing **LISP** Source Code Compiler & Assembler, Assembly & **LISP** Code Intermixing, Compiled Code Library Loader, Numerous Utility Packages, Hardware and Operating System Access, Session Freeze and Restart, Comprehensive 350 page Manual with Usage Examples, and much more is available with the ADVANCED INTERPRETER, your environment may cause constraints, review catalog.

Other **UO-LISP** products include **META** a translator writing system, **RLISP** a high level language, and **LISPTEX** a text formatter.

!!NEW!! LEARN **LISP** FOR $39.95

The "LEARN LISP" Interpreter includes a subset of the above description, manual includes tutorial.

The **UO-LISP** Programming Environment runs on the **H89** with CPM.

Package Prices range from $39.95 to $300.00.
Manuals may be purchased separately.

TO ORDER: First send for your FREE catalog which lists technical details, distribution formats, and ORDER FORMS.

VISA and Mastercard accepted.

Northwest Computer Algorithms
P.O. Box 90995, Long Beach, CA 90809 (213) 426-1893

Circle #104 on Reader Service Card

USE ALL YOUR SPECIAL FUNCTION KEYS

With WORDSTAR™

WSKEY™: Now you can take the mystery out of WordStar with SKILL DATA's WordStar enhancement, which implements all twenty-one of the H/Z89-19 function/pad keys or all twenty-three Z-100 labeled key commands.
Function key commands are labeled by a twenty-fifth line banner, which can be toggled on and off by you during your session.

With dBASE II™, ZIP™, SuperCalc™

DBKEY™, ZPKEY™, and SCKEY™: Just type your favorite SKILL DATA key command. All function key commands are labeled by a twenty-fifth line banner, which can be toggled on and off by you during your session. Pad keys also function and send multiple key inputs with a single stroke. All previous command key sequences are still available for the old and painful ways.

Just $29.95 for each program (plus shipping charges shown below).
H/Z89-19 diskettes are 5.25" 10HS, require CP/M 2.2.03.
Z-100 diskettes are 5.25" SS; specify CP/M-85 or Z-DOS.

Available in many Heathkit Stores and Quikdata Inc., Sheboygan, WI...or complete and mail this order form with your check or money order today!

Mail to SKILL DATA, P.O. Box 1943, Olympia, WA 98507.

Yes, I want to use all my special function keys! Send me:

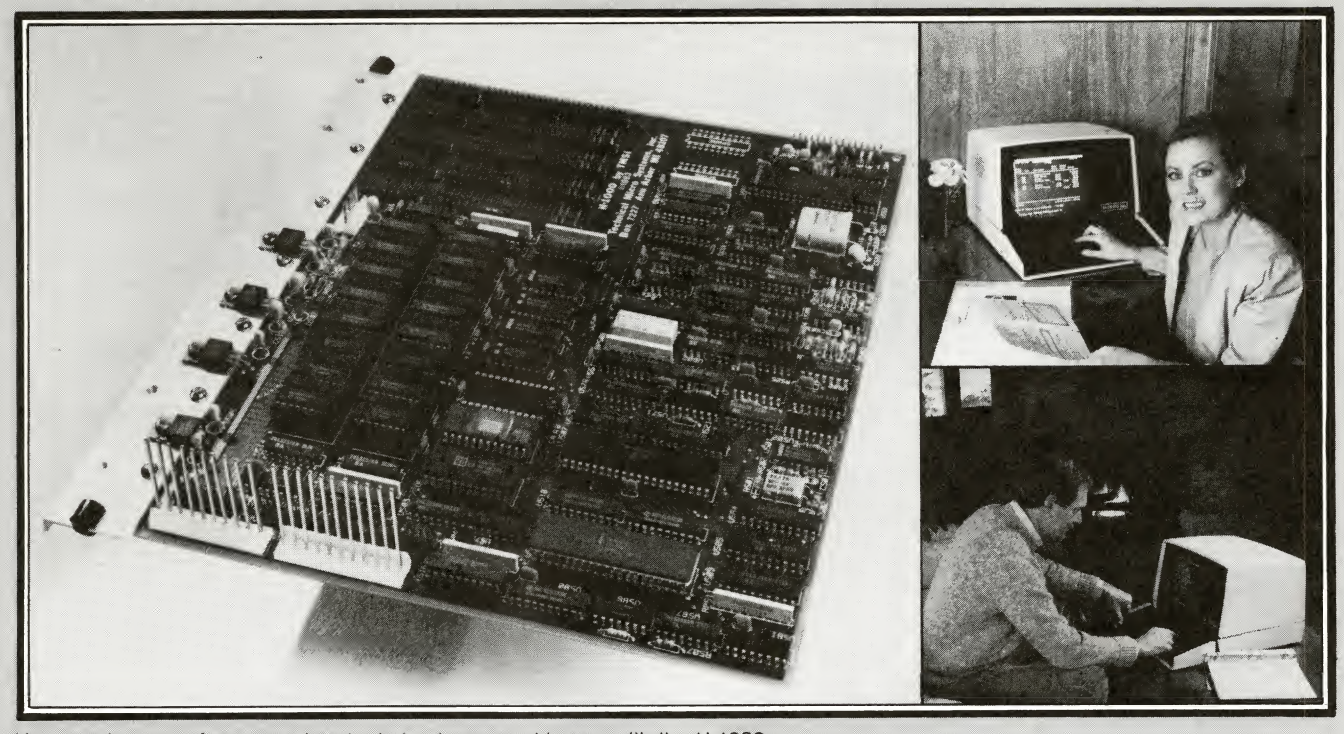
☐ WSKEY—keys to WordStar: ☐ for H/Z89-19 ☐ for Z-100	$29.95
☐ SCKEY—Keys to SuperCalc (for CP/M only)	$29.95
☐ DBKEY and ZPKEY—keys to dBASE II: ☐ for H/Z89 ☐ for Z-100	$29.95

For Z-100 diskettes, specify operating system: ☐ CP/M-85 ☐ Z-DOS

Name _____
Street _____
City _____ State _____
Zip _____ Phone _____
Visa/MC Card # _____ Expires _____

All orders shipped by first class mail. Include $3.00 per order for shipping and handling, $5.00 for non-U.S. orders. Payment by check, money order, or Visa/MasterCard. Allow 2-4 weeks for delivery. 206/352-0669 (evenings). (s)

SKILL DATA, P.O. Box 1943, Olympia, WA 98507



You can be a performance leader in business or at home with the H-1000.

Great News for Heath & Zenith Owners!

A Z80/8086 Upgrade for the H89/Z89

The H-1000 is a plug in replacement for your present CPU board, giving you twice the speed, twice the I/O capacity and four times the memory. Yet it's totally compatible with all your present H89/Z89 hardware and software. Best of all, we've added the 8086, a true 16-bit CPU for the high performance software of the 80's. You get compatibility with such machines as Zenith Z-100 and IBM PC at a fraction of the cost of a new system.

Regardless of the operating system, you get virtually all the benefits of an additional disk drive, even if you only have one. Our "ghost disk" system loads your disk into the memory. This becomes the extra disk drive and leaves your real drive free for another disk. RAM is many thousands of times faster than the best disk drive, so you get practically instantaneous access to information. That's important for programs requiring frequent access to large data bases, or if you simply don't like waiting while your computer talks to your disk drive.

TMSI has taken the best features of your 8-bit computer and combined them with the best of the 16's to give you a package that's state-of the-art... and the ONLY package that lets you build on all your current investment...instead of starting over!

The H-1000 comes safely packaged, fully assembled and tested. It can be installed in under an hour using the manual provided. No soldering or special tools are required. A full 90 day warranty covers each unit with an optional service contract available.

Compare this performance leader to other systems. We think TMSI gives you your best choice.

COMPATIBILITY CHART

	8/16 BIT SYSTEM	16 BIT SYSTEM	8 BIT SYSTEMS		8/16 BIT SYSTEM
	Z100	IBM PC	H89/Z89	DG SUPER 89	H-1000
Runs Z80 and 8080 code	no	no	yes	yes	yes
HDOS 2.0 compatible	no	no	yes	yes	yes
CP/M compatible	yes	no	yes	yes	yes
Runs all H89/Z89 software	no	no	yes	yes	yes
Supports all H89/Z89 hardware	no	no	yes	yes	yes
8-bit clock	5MHz	none	2MHz	4MHz	2/4MHz
16-bit clock	5MHz	4.7MHz	none	none	8MHz
Maximum memory	756k	756k	64k	256k	1048k
Runs MS—DOS and CP/M-86	yes	yes	no	no	yes
color graphics	yes	yes	no	no	no
price/performance	ouch	ouch	good	better	best

Complete systems as well as the H-1000 board are available. For more information and dealer listings, call or write NOW. Dealer inquiries invited.

TMSI

TMSI
Technical Micro Systems, Inc.
P.O. Box 7227, Dept. A
366 Cloverdale
Ann Arbor, MI 48107
(313) 994-0784

copyright 1983 by TMSI

H-1000 and TMSI are trademarks of Technical Micro Systems, Inc. H89, Z89, Z100 Heath and HDOS are trademarks of Heath/Zenith Corp., Benton Harbor, Michigan. MSDOS is a trademark of Microsoft, Bellevue, Washington. CP/M and CP/M-86 are trademarks of Digital Research, Inc., Pacific Grove, California. Super 89 is a trademark of D.G. Electronic Developments Co., of Denison, Texas. IBM PC is a trademark of International Business Machines Corp., of Armonk, New York.

BASIC Grocery Shopping

This program provides a shopping list with quantities and a price total.

Robert L. Schlessman

Most husbands who own personal computers have at some time felt the need to write a program that would impress their wives with the practicality of owning such a device. (I suspect that if the computer user is the wife, the basic problem may not be too different, although the particulars probably will be.)

My wife Mary was the classic example of a skeptic. She recognized the educational benefits I could get out of owning a computer. I'm an electronics technician with PPG, a leading glass manufacturer. So it's important for me to stay abreast of the latest technology. My H89 came as part of a correspondence course I took through National Technical Schools. Since it was paid in full by my employer and my GI benefits, Mary had no complaints about the initial cost. She just didn't see any practical applications for a home computer. So the idea of GLIST.BAS was born. It's shown in Listing 1.

GLIST.BAS is a program that will allow the user to generate a grocery list including the price and quantity of each item as well as the total expenditures. It could be modified to be used to generate an inventory listing for a small business or any application where a quantity and price accounting is the end desire.

We are a typical middle-class family of four on a typically tight middle-class budget. So the concept of a program that would help to keep us within the budgeted amount for groceries appealed to Mary. In addition, the added capabilities of printing the list, as well as giving us a check-off list at the store, were features not to be taken lightly. Her doubts faded more with each use and she now looks forward to the opportunity to use the computer.

Running GLIST, we are presented with a list containing everything we normally buy, with prices. We indicate those items we want to buy on this trip and GLIST tallies up the bill and prints the list.

As you might suspect, the tedious part of the job is the initial creation of the data file. Our basic purchases do not change radically, however. So once done, the data file only needs a periodic update to keep the prices reasonably accurate. Your favorite editor or word processor should do the job nicely. We update the prices weekly after each major shopping trip. If prices change less than five cents, we don't generally change them. The average number of changes is five and takes only a few minutes.

You may, of course, think that a shopping list is too simple to merit computerizing. Yet those of you with children of the errand-running age might do well to reconsider. As a labor-saving device, kids may never have the reliability of computers, but teaming up their energy with the computer's accuracy has its benefits.

What the program does

The program actually consists of two parts: the main program, GLIST.BAS; and a data file, GLIST.DAT. It is written in Benton Harbor BASIC, under the Heath Disk Operating System (HDOS). It should be readily adaptable to Microsoft BASIC for those of you who have that version. I have a single-drive system, with 48 kilobytes of random-access memory (RAM). But the program will run on a 32K system. It uses the 25th line and direct cursor addressing features of the H/Z89 extensively.

The data file contains the master grocery list. Our list contains about 300 items. But the size of this file is limited only by the amount of available disk space. Each item consists of an alpha-numerical item number, the item description, and its price. (A sample file is shown in Listing 2.)

The main program reads data from this file and displays it twenty lines at a time on the monitor. The user is then prompted for the desired item numbers and the quantity of each item via the 25th line. A running total of expected expenditures is kept on the right-hand side of the 25th line.

To view the next twenty items, the user types MORE at the item-number prompt. When finished selecting from the list, the user then types NO at the prompt. The program will then ask if any coupons (Mary is big on these) are to be considered. If so, they are then entered

Listing 1: GLIST.BAS allows you to computerize your grocery list. Written in Benton Harbor BASIC running under HDOS, it provides you with a printout showing items, prices, quantities, and total cost.

```
00005 REM  GROCERY LIST PROGRAM BY ROBERT L. SCHLESSMAN
00010 REM  LATEST REVISION 27 DECEMBER 1983
00015 REM  DIMENSION ARRAYS CLEAR VARIABLES
00020 DIM Q$(100):DIM G$(25):DIM G2$(100)
00025 A=0:C=0:I=0:N=0
00030 REM  ASSIGN STRING VARIABLES TO ESCAPE SEQUENCES
00035 REM  E$=ESCAPE     L1$=ENABLE 25th LINE
00040 REM  L2$=DISABLE 25th LINE  S$=SAVE CURSOR POSITION
00045 REM  B$=GO TO 25th LINE  P$=SEND CURSOR TO SAVED POSITION
00050 E$=CHR$(27):E1$=E$+CHR$(69):L1$=E$+"x1":L2$=E$+"y1"
00055 S$=E$+"j":B$=E$+"Y8 ":P$=E$+"k"
00060 PRINT CHR$(27)+CHR$(72)+L2$
00065 PRINT E1$: REM CLEAR SCREEN AND PRINT INSTRUCTIONS
00070 PRINT "     This program is designed to create and print a shopping"
00073 PRINT "list complete with quantities, prices, and total expenditures."
00076 PRINT "It is used in conjunction with the data file, 'GLIST.DAT'."
00079 PRINT
00082 PRINT "     A master list will be displayed 24 lines at a time. Then"
00085 PRINT "you will be prompted via the 25th line for item numbers and"
00088 PRINT "quantities.  When you wish to see the next set of items, type"
00091 PRINT "MORE at the item-number prompt.  After viewing the entire list"
00094 PRINT "and selecting all items, type 'NO' at the item-number prompt."
00097 PRINT
00100 PRINT "     If an invalid item number is entered, type '0' at the"
00103 PRINT "quantity prompt.  If the invalid number is not caught prior to"
00106 PRINT "quantity entry, the program will re-prompt for the item number."
00109 PRINT
00112 PRINT "     After you enter 'NO', the program will prompt for any"
00115 PRINT "coupons to be used and adjust the total accordingly.  After you"
00118 PRINT "enter coupons, the list will be printed on the line printer."
00121 PRINT "
00124 PRINT "     When entering coupon amounts, take care to enter only"
00127 PRINT "numbers. If you enter a letter, the program will exit; you'll"
00130 PRINT "get a 'Syntax error' message, and be stuck down there on the"
00135 PRINT "25th line. If that happens, type 'RUN' and start over again."
00140 PRINT :PRINT "    (Press 'RETURN' to begin)";:PAUSE
```

→

```
00145 PRINT E1$: REM CLEAR SCREEN AND DISPLAY MASTER LIST
00150 OPEN "GLIST.DAT" FOR READ AS FILE #1
00155 FOR Y=0 TO 20
00160 J=CIN(1)
00165 IF J<=0 THEN CLOSE #1:GOTO 195
00170 LINE INPUT #1,;G$(Y)
00175 G$(Y)=CHR$(J)+G$(Y)
00180 PRINT G$(Y)
00185 NEXT Y
00190 REM  SET UP 25th LINE GET FIRST ITEM NUMBER & QUANTITY
00195 GOSUB 1000:IF C<>1 GOTO 230
00200 LINE INPUT "ENTER THE FIRST ITEM: ";I$:PRINT SPC(30)
00205 IF I$="MORE" THEN PRINT P$+L2$:GOTO 155
00210 LINE INPUT "HOW MANY? ";Q$:PRINT SPC(40);
00215 IF Q$="0" THEN 200
00220 GOTO 320
00225 REM  PRINT SUBTOTAL & GET NEXT ITEM NUMBER & QUANTITY
00230 PRINT "SUBTOTAL - $";T2:LINE INPUT "ENTER NEXT ITEM: ";I$:PRINT SPC(30)
00235 IF I$="MORE"THEN PRINT P$;SPC(30):A=0:GOTO 155
00240 IF I$="NO" THEN 270
00245 PRINT B$
00250 LINE INPUT "HOW MANY? ";Q$:PRINT SPC(40);
00255 IF Q$="0" GOTO 230
00260 GOTO 320
00265 REM  CHECK FOR COUPONS. DISABLE 25th LINE & RETURN TO SAVED POSITION
00270 GOSUB 3000:GOSUB 2000
00275 REM  CLEAR SCREEN
00280 PRINT E1$
00285 REM  PRINT THE LIST WITH PRICES & TOTAL
00290 OPEN "LP:" FOR WRITE AS FILE #2
00295 FOR L=0TO I-1
00300 PRINT #2,MID$(G2$(L),6)" "Q$(L)" ""EACH"
00305 NEXT L
00310 PRINT #2,"TOTAL - $";T2:PRINT #2, SPC(80):PRINT #2, SPC(80):GOTO 365
00315 REM  FIND A MATCH FOR ITEM NUMBER ON MASTER LIST
00320 FOR N= A TO 20
00325 IF LEFT$(G$(N),4)=I$ THEN G2$(I)=G$(N)
00330 T1=VAL(Q$)*VAL(RIGHT$(G2$(I),4)):Q$(I)=Q$
00335 T2=T2+T1:IF G2$(I)=G$(N) THEN I=I+1:A=N:IF G2$(I-1)=G$(N) THEN 230
00340 NEXT N
00345 REM  NO MATCH? THEN BAD ITEM NUMBER. PROMPT FOR IT AGAIN
00350 PRINT CHR$(10):LINE INPUT "REENTER LAST ITEM: ";I$:PRINT SPC(30)
00355 A=0:GOTO 235
00360 REM  CLOSE ALL OPEN FILES & END PROGRAM RUN
00365 PRINT #2,TAB(20);"HAPPY SHOPPING!":CLOSE #1:CLOSE #2:STOP
01000 REM  SUBROUTINE TO SAVE CURSOR POSITION & ENABLE 25th LINE
01005 C=C+1:PRINT S$+L1$+B$
01010 RETURN
02000 REM  SUBROUTINE TO RETURN TO SAVED POSITION & DISABLE 25th LINE
02005 PRINT P$+L2$
02010 RETURN
03000 REM  SUBROUTINE TO ACCEPT ANY COUPON AMOUNTS
03005 LINE INPUT "DO YOU HAVE ANY COUPONS? ";C$
03010 PRINT B$:IF LEFT$(C$,1)<>"Y" THEN RETURN
03015 PRINT SPC(30):INPUT "ENTER THE AMOUNT (ONE AT A TIME): ";C
03020 T2=T2-C
03025 PRINT SPC(40) "SUBTOTAL - $";T2
03030 PRINT SPC(30):LINE INPUT "ANY OTHERS? ";C$:IF LEFT$(C$,1)="Y" THEN 3015
03035 RETURN
```

one at a time and the running total is adjusted accordingly. When all coupons have been entered, the list is then printed out by the printer with a greeting.

How it does it

Although there are REMark statements in the program listing, I believe a brief explanation is in order. I will run through the program according to the order of execution.

Lines 20 to 55 simply dimension all arrays, set any counters to zero, and assign string variables to the escape sequences I use in the program.

Lines 150 through 185 open the master grocery list file GLIST.DAT, read it in twenty lines at a time, and display it on the screen. Lines 160 and 165 read the first character in each line and test it for an end-of-file (EOF). If an EOF is seen, the file is closed and the program jumps out of the loop.

Line 195 calls the subroutine that enables and sets up the 25th line, saves the cursor address, and moves the cursor to the beginning of the 25th line. If this is not the first item, the variable C will be greater than zero and the program will jump to the appropriate line.

Lines 200 through 215 prompt for input number and quantity, test for a MORE, and accept a zero quantity if you typed in an invalid item number. I added this feature at Mary's suggestion so we wouldn't have to wait for the program to run through the remaining items before an error was caught. Just a little time saver for typists who may be all thumbs. Lines 225 through 255 perform the same function as lines 200 through 215, only there is a test for a NO and the subtotal is now being displayed and updated.

(If you want things to move more quickly, you can change MORE and NO to single characters. That would be on lines 205, 235, and 240.)

The program now jumps to line 320. There it uses a FOR... NEXT... loop to look for a match between the entered item number and one of the twenty items that are currently on the screen. Also within the loop, the total expenditure is updated. The program stores the matched item in the string array G2$(I), then jumps back to get the next item number.

If you have somewhat more expensive tastes than we do, you'll want to change line 330. Putting a price above $9.99 in the data will cause an error in math. This is because the program only checks the four rightmost characters in the item string read in from the master list. It was at Mary's suggestion that I did this because we have never bought items at the grocery store that cost more than $9.99.

To allow for higher prices, change line 330 to check for however many characters are needed in the price. Changing the 4 there to a 5 will permit a maximum price of $99.99. All of the prices on the master list would then have to be changed to NN.NN format instead of the current N.NN format shown in Listing 2. (If it isn't in the format BASIC is looking for, it will be evaluated as zero.

Subroutine 1000-1010 saves the cursor position and enables the 25th line. Subroutine 2000-2010 disables the 25th line and returns to the saved position to list the next twenty items. Lines 3000 to 3035 are the subroutine to accept entry of any coupons.

Finally, lines 285 to 310 are the subroutine to print the list. The program then jumps to line 365, closes all open files, and ends.

Things to look out for

I would like to add a precautionary note. When creating GLIST.DAT, the master grocery list, you should enter either tabs or spaces in any blank lines.

If you use only a carriage return, it will be seen as the first character in the following line. The end result will be that if the particular item is selected for a list, the program will never find a match. This caused me some considerable head scratching before I found the fix.

Also, don't end the file with a blank line created with a carriage return. This will give you an END OF FILE read error and exit from the program. I am not sure why these things occur since I do not have the source code for HDOS. Maybe some more knowledgeable person out there can tell us why.

Of course, you should be able to find places where GLIST can be improved. It hasn't really been "bullet-proofed," since I meant it to be used by people who were familar with it. Although kids

```
PARTIAL LISTING OF GLIST.DAT

BEVERAGES (BE)

BE01 KOOL-AID 0.18
BE02 ORANGE JUICE 0.92
BE03 APPLE JUICE 0.59
BE04 TOMATO JUICE 0.60
BE05 GRAPEFRUIT JUICE 0.54
BE06 EAGLE RIVER JUICE 1.04
BE07 BOTTLE DEPOSIT 0.80
BE08 ALBA-66 1.55

BABY PRODUCTS (BP)

BP01 BABY SHAMPOO 1.17
BP02 BABY FOOD 0.22
BP03 DISTILLED WATER 0.74
BP04 DIAPER WIPES 1.87
BP05 LARGE DISPOSABLE DIAPERS 8.58
BP06 BABY FOOD, MEATS 0.55
BP07 BABY CEREAL 0.56

BREADS & PASTRIES (BR)

BR01 WHITE BREAD 0.27
BR02 PEPPERIDGE FARM BREAD 0.94
BR03 LESS BREAD, WHEAT 0.99
BR04 ENGLISH MUFFINS 0.79
BR05 BAGELS 0.65
BR06 STUFFING MIX 0.73

CEREALS & BREAKFAST FOODS (CB)

CB01 SHREDDED WHEAT 1.38
CB02 RICE KRISPIES 1.90
CB03 WHEATIES 1.72
CB04 CHEERIOS 2.07
CB05 KIX 1.12
CB06 CORN FLAKES 1.57
CB07 OATMEAL 0.86
CB08 CREAM OF WHEAT 1.38

END OF MASTER GROCERY LIST
```

Listing 2: GLIST.DAT is the master grocery list from which the user selects items. This is a shortened sample to show the form; your list can be as long as allowed by available memory.

were mentioned at the beginning of this article, you might not want them to use GLIST in its present form.

Then again, they might be just the ones to test it! Exiting GLIST with a control-C, for instance, is sort of fun: everything thereafter just whips across the 25th line. (To get the rest of your screen back, you can run GLIST over again.) And entering a non-numeric character for a coupon amount can open to you the wonderful world of syntax error.

While bullet-proofing can be fun, though, it also adds to program length. And right now, GLIST is fairly brief. For that matter, some of you may wish to make it *shorter* rather than longer.

But whether you make changes or leave it as it is, I hope that those of you who choose to use this program will find it as useful as Mary and I have. If your motives are the same as mine were, I'm sure you will find it a considerable improvement over the perennial checkbook balancing program. Any comments, questions, or improvements will be more than welcome.

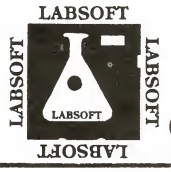
CLINICAL LABORATORY
DATA PROCESSING SOFTWARE
FOR THE H/Z89

Ideal for the small hospital or independent laboratory. Manual entry and data acquisition from lab instruments.

PROVEN IN REAL-TIME
LABORATORY ENVIRONMENT

Programs in BASIC and assembly language allow entry of virtually *all* laboratory data and generate patient and financial reports, workload records, standard deviations, numerous customized report formats (RIAs, Urinalyses, Coagulation Tests, Panels, Etc.).

Z-DOS, HDOS, and CP/M formats.
Cytology and Surgical Pathology programs also available.
On-site installation, consultation and customization can be arranged.



CALL OR WRITE FOR DETAILS
LABSOFT
(805) 487-8776 P.O. BOX 5026 OXNARD, CA 93031

Circle #124 on Reader Service Card

Z-POWER 100

A series of programs including source code in basic that illustrates the awesome graphics potential of the Z-100. Some of the programs are an on-screen sweep second hand clock, examples of how to obtain over 35 distinctive colors. Some extra utilities too... -->$25.00

TURBO Z-100

Speed-up hardware enhancement for the Z-100 8088 MPU. Kit includes plug in unit and documentation for easy hookup. Requires removal/replacement of one chip for a + 45% increase in processing speed. --> $25.00

CRACK.COM

Z-Basic unprotect facility for recovering and examining protected basic programs. A must for software developers. --> $30.00

LEGAL TENDERIZER

A home financial management package that is as good as gold's, but less costly. Menu driven income and outgo, financial statement generator, checkbook balancer and more. --> $40.00

HOME INVENTORY

A file manager for recording all household goods recorded in your home room by room. Initial cost information of each article as well as a room total for insurance adjustment purposes. Updated your list lately? --> $40.00

Prices include shipping. CA residents + 6% sales tax.

mail your order to:
SAN DIEGO SCIENTIFIC
Micro Products Division
815 Third Avenue, #301
Chula Vista, CA 92011
(619)425 2262

See our other ad announcing the $100 reward.

Circle #181 on Reader Service Card

WIZARDRY NEWS

The Best Software for the Best Computers!

REACTOR-100

Nuclear power at your fingertips!

You are at the controls of a high capacity pressurized light water nuclear reactor in this exciting simulation. **REACTOR-100** makes full use of the outstanding color graphics capability of the Z-100. A "real-time" **schematic display** of the plant and its conditions, as well as a full instrument panel, give you complete control to safely (or not so safely!) operate the reactor.

The program can optionally be used with the Software Wizardry **P-SST multifunction board** for realistic sound effects. Plugging in the **Wizardry Lightpen** allows complete control simply by pointing at the screen.

Not just a game, this superbly crafted system is also an outstanding educational tool for power engineers, and those simply interested in "the way things work".

REACTOR-100 runs under ZDOS on the H/Z-100. Also available for the Z-150/160, but schematic does not display in color.

Palette Version 2.0

Now with animation

The best gets better! **Palette,** the best selling interactive graphics program for the H/Z-100, lets you draw superb color or monochrome graphics displays. Save them to disk with a unique compression algorithm to save disk space, or dump them to compatible printers, black and white or color.

Other features include support for the **Wizardry Lightpen,** interface for joystick control with the **Wizardry P-SST board,** and support of the high resolution interlace mode of the H/Z-100.

Now, with the newest release, we've added **animation,** and a host of other improvements. If you've always felt you had a little Michaelangelo or Cecil B. DeMille in your blood, now's your chance to express yourself! Create masterpieces. Store them on disk. Manipulate them, animate them! Palette comes with extensive documentation and a **complete tutorial.**

For those of you already sold on Palette, $20 and return of your distribution disk will get you Version 2.0

Palette runs under ZDOS on the H/Z100 and requires color RAM and at least 192K system memory.

ESP Dial in Communications

New Product!

ESP, our newest communication software package for Heath/Zenith computers, is a bulletin board system with a difference — it creates **two system consoles.** Anything typed on one will appear on the other, and be read by the system. The second terminal can be a station in another room, or a modem for dial-in capability!

ESP runs under CP/M-80 on the H-89 & 90, and under CP/M-85 on the H/Z100

ZLYNK/II Modem Communications

New version available

ZLYNK/II, THE communications software for the Z-100, even features it's own language — **ZLINGO!** New version now available features **CP/M-86 compatability!** In addition, the upgrade includes Compuserve "B" protocol, improvements to existing overlays, more configurable options, more ZLINGO commands, and user-defined function keys.

The documentation has been revised, and an index included. Now that we've made this powerful system even better, you've no excuse not to talk to the world!

ZLYNK/II runs under CP/M-85 or CP/M-86 on the H/Z-100.

Available from most Heathkit Electronic Centers and many Zenith Data Systems dealers and distributors. Dealer inquiries welcomed.

1106 First Capitol Drive St. Charles, MO 63301 (314) 946-1968

Circle #166 on Reader Service Card

Forth Goes Heath/Zenith

A major virtue of Forth is that it can be extended and modified by the programmer to suit individual needs.

Brian and Christine Ence

When you finally decide that there must be a language better than BASIC, you might take a look at Forth. Forth is about 20 times faster than BASIC. It's compact, structured, and interactive. And Jim Teixeira's SoftShop of Sudbury, Massachusetts, offers a version, HForth-79, that's especially designed for use on Heath/Zenith computers.

To some, Forth may seem something of a cult. That's not too surprising: once you get used to it, you may become something of an evangelist, yourself. Forth combines some of the virtues software hackers find in BASIC, with the virtues of a structured programming language such as Pascal.

Like BASIC, Forth is sold as an interpreter. The Forth interpreter sits in memory, running alongside the quasi-English of your program, translating it into a form readable by the computer.

But, unlike BASIC, there's no need to buy a separate compiler to convert your program into a form that will run on its own. The compiler is an integral part of Forth. (See DESTROY and TURNKEY, in the comments accompanying this article, "Selected HForth-79 Extensions.")

Like Pascal, Forth is a structured language. And as in Pascal, you can easily build libraries of small routines to use as modules in a variety of programs. Unlike Pascal, however, Forth is designed to make that an easy and inherent, even a necessary, part of your programming.

The characteristic that sets Forth apart from other languages is that by building these libraries you can, in effect, add to the *language* itself or modify it to suit your purpose. You can then make these changes a permanent part of your working copy. Forth is not only a language but also a toolkit for creating a new language to suit your special applications.

And even though Forth in use becomes changed into specialized "dialects," another advantage is its easy portability. A program written in one version of Forth can be run using a different version of Forth by simply preceding the program with a list of definitions of the "words" unique to the version in which the program was originally written. Compare this, for example, to the work that would have to be done to convert a program written in Z-BASIC to one in Benton Harbor BASIC.

For many programmers, then, Forth's virtues are immensely attractive, almost addictive. With the virtues, however, there can be costs.

One possible problem is that Forth code can be hard to read for the beginner. The syntax is unusual; and a poorly written, undocumented program can be almost impossible to follow. However, it is easy to write well structured, documented programs.

Next, Forth passes data between routines by means of a temporary holding buffer, the stack. The stack architecture of Forth can add to the unreadability of Forth code. Keeping track of what is on the stack is not always easy. But once mastered, the stack provides a simple method for passing data between routines without losing execution speed.

The structured style of Forth requires that a program be designed from the top down and coded from the bottom up.

Finally, Forth does very little error checking and will not warn you of many of the errors that another language would detect and identify. This limitation, however, can be turned to good advantage.

Since the error-checking procedures are part of a language like BASIC, they always take up space in random-access memory (RAM). They sit there even if your program has been completely debugged. With Forth, you have to incorporate your own error-checking procedures in a program during its development. But later, when the program is running satisfactorily, the error-checking functions can be deleted to increase execution speed and to save memory space.

Some of you may be put off from investigating Forth by an impression that it is too esoteric or too difficult to learn. I think you will find, though, that it is neither.

Admittedly, Forth is not a common language. And at first glance, a Forth program may seem difficult to understand. But with an explanation of some of the basic Forth programming rules, you should be able to follow the operation of a Forth program.

The following paragraphs, of course, cannot actually teach you how to *use* Forth; but they should help you to understand the Forth code in this article. And that is a good first step to learning the language.

How Forth works

Let's begin by getting a bit more background. (If you are already familiar with Forth, you may want to skip down to the description of HForth-79.)

You may have heard Forth called a "threaded language." This is because it consists of a few basic machine-language subroutines which are "threaded" together to form more functional routines. These higher-level routines are then threaded together to form yet more powerful routines.

Routines are threaded together by storing the addresses of the subroutines with the name of the new routine in a part of the Forth object code called the dictionary.

Any entry into the dictionary is called a word. A "word" may be a single operation, a subroutine, or an entire program. In addition to an executable routine, a word may also be a variable or other data structure. Every word has a name which may be a single character or as many as thirty-one characters.

The process of adding entries into the dictionary, i.e., defining a word, is called compilation. Compilation can be done by entering a definition directly from the terminal or from source code stored on the disk.

The source of entries for the compilation process (whether from the terminal or disk) is called the input stream. (If the input stream is from the disk, the process is also called loading.)

Forth's interpreter routine is required to fetch the addresses that are stored along with a routine and execute the subroutines at those addresses. Because only simple functions are required of the interpreter, Forth programs run much faster than other interpreted lan-

guages such as BASIC.

Forth is not as fast as assembly language, though. But when that kind of speed is required, words can be defined in assembly language, assembled, and stored as machine code. The assembly is done automatically when the word is compiled into the dictionary. The assembler which does this is part of most versions of Forth. Once entered, whether from the terminal or from the disk, the new word can be immediately executed and will run at machine-code speed.

Reading a Forth program

Some distinctive characteristics of Forth are: 1) the structured style of the coding process; 2) the use of "screens"; 3) the rules for naming Forth words and variables; 4) the methods for transferring data between routines; and 5) the use of post-fix notation. (Listing 1, TTY.FTH, is a sample program written under HForth-79.)

1) The structured style of Forth requires that a program be designed from the top down and coded from the bottom up. This means that a task to be programmed is broken into sub-tasks which in turn are broken into sub-sub-tasks until the tasks are small enough so that they can be coded in Forth.

The coding process in Forth consists of defining words. A definition consists of a colon, the name of the word being defined, its definition, and a semicolon. (This is referred to as a colon-definition to distinguish it from other definitions, such as for variables.) Forth standard words are used to define the lowest level tasks (words).

Words defined by the user are then used to define the next higher level of tasks or words. The process of defining higher and higher level words continues until the last word defined is the application program itself.

Thus, one way to read a Forth program is to start at the end where the highest level words are defined. Then look back in the program to find the definition of words which define the highest level words. Continue looking back until you have learned the definitions of all the words.

2) Definitions are stored in blocks of memory called "screens" consisting of 1,024 bytes. Forth uses the disk for virtual memory. This requires that portions of memory be swapped with data on the disk when that data is requested. This swapping is done one screen at a time. The size of a screen is convenient for the swapping process. Its contents are typically displayed on a terminal screen as 16 lines of 64 characters.

The stack provides a simple method for passing data between routines without losing execution speed.

A screen may be used to store either data or programs. Typically, when a program is stored in a screen, the first line of the screen is used as an index of important words defined in that screen. This is done with the Forth word "\", the backslash. It's like REMark in BASIC.

3) Names used for Forth words may be up to 31 characters but must have no spaces in them. Sometimes, in order to enhance the readability of a name, a phrase may be used. In that case, the spaces between the words may be taken up with punctuation marks to observe the no-spaces rule. (For example, FIND.FILE.SIZE.)

Names of variables observe the same rule. Variables may be created by using the Forth words: VARIABLE, CONSTANT, ARRAY, etc. For example, VARIABLE BYTES creates a variable named BYTES.

Forth normally allows two bytes to store a variable. ALLOT is used to extend the amount of storage space assigned to a variable. It is usually employed to permit storing character strings.

The use of VARIABLE and CONSTANT are illustrated in Listing 1 (lines 2, 3, and 4 of screen 1, and line 1 of screen 2). Note the use of ." (period, quote) to store the character string SYOTTY in the variable DFLT.BLOCK.

4) Another concept key to understanding Forth is the *stack*. Data may be transferred between words in the conventional manner with variables. But it may also be done through the stack. The stack is a last-in, first-out buffer.

When a number is entered from the terminal or encountered during execution of a Forth word, the number is pushed onto the top of the stack pushing anything else on the stack down. The next word which requires an input pulls from the stack the top number or numbers until it has all the data it needs. Likewise, a word may leave behind a number to be used by another word. Writing a Forth program often involves careful manipulation of the data on the stack.

Sometimes it is unreasonable to pass data on the stack. There may be a lot of data to be handled, or it may be cumbersome if the data isn't going to be used until much later. In those cases, data can be stored to and fetched from named variables using the words "!" and "@" respectively. For example, if BYTES were previously defined as a variable, then "n BYTES !" would store the number

EMULATE

Your H89 can now Read and Write to:

OSBORNE **XEROX**
MORROW **TELEVIDEO**
CROMEMCO **TRS-80**
and other formats

Requires 64K and a dual disk system with HEATH CP/M 2.2.03 or CDR BIOS. Include your CP/M serial number when ordering.

For CDR controller	$39
For H37 controller	$59

CDR Controllers at discount!

For H89	$345
For H8	$419

REAL TIME CLOCK

Install the TIM2 in a left expansion slot of your H89 to have date and time keeping with battery backup. Requires soldering 4 wires to the CPU board.

Kit	$55
Assembled	$65
Software on disk	$10

AUTOMATIC REPEAT

Simple plug-in installation of the REP2 gives your H89/H19 keyboard the same auto-repeat function you get with a Z100. Provision for a defeat switch.

A Must for Word Processing!

Kit	$32
Assembled	$40

The Software Toolworks® We sell it at discount!

WE PAY POSTAGE! CA residents add 6% tax. Specify disk format on software.

Call or write for catalog.

ANALYTICAL PRODUCTS

40793 Gibbel Road
Hemet, CA 92343 **714/929-6919**

Circle #197 on Reader Service Card

The Micro-Connection of Tampa Bay, Inc.
Proudly Presents The
Z-160 PC Portable Computer with 10.6 MB Winchester Hard Disk

- Completely Portable System
- 320K Memory Standard
- Plated Media Winchester
- Unconditional 1-year Winchester Warranty
- System Set Up, Tested, Ready to Run
- "Plug it in and it's ready to run."

Introductory Offer
$3999

- Sand Star Clock Calendar Optional Installed & Tested $55.00

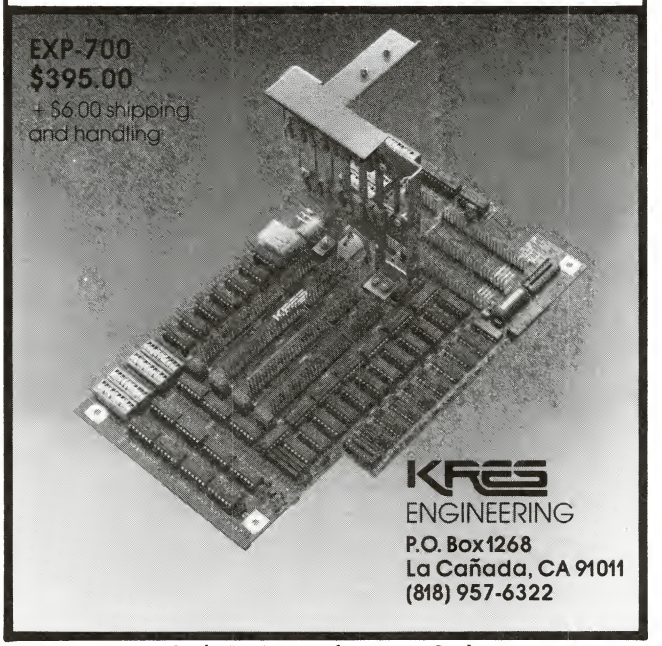
Inquiries invited on our entire line of Zenith, Okidata, and Maynard Electronics products.
813–963–7797
Visa — MC — AMEXPRESS — Money Order

The Micro-Connection of Tampa Bay, Inc.
11714B N. Dale Mabry
Tampa, FL 33618

Circle #227 on Reader Service Card

Expand your H/Z89-90 from KRES
Make your computer a more useful friend

- Now you can add all of those extra boards you've always wanted (color graphics, speech, robotic control, parallel— to name a few).
- The Kres Expansion enables you to put seven full sized boards inside your H89 cabinet; no external cables or boxes.
- Plug in any boards without any software modification.
- Simple to install and use.



Circle #195 on Reader Service Card

No more disk incompatibility!

CONVERT the highly acclaimed diskette conversion program is now available for all Zenith MS-DOS and Z-DOS computers. CONVERT lets your computer read, write and format over 30 types of diskettes, including Z-90, Z-100 and most popular CP/M types! Exchange diskettes with friends and associates! Transfer data and document files from old computers. Use an MS-DOS or Z-DOS computer at work and a CP/M computer at home. Never be plagued by disk incompatibility again! CONVERT for MS-DOS and CONVERTZ for Z-DOS are available for $99 each from Selfware (MasterCard and Visa accepted) or from most Heath/Zenith dealers.

Selfware, Inc.
3545 Chain Bridge Rd.
Suite 3
Fairfax, VA 22030
(703)352-2977

Circle #137 on Reader Service Card

Affordable Computer Components, Equipment, Supplies and Services

Money Saving Deals

PEACHTEXT 5000: Word processing package includes PEACHTEXT word processor, PEACH SPELL electronic spelling checker, LIST MANAGER for mail merging functions, PEACHCALC electronic spreadsheet and ELECTRONIC THESARUS. This package runs on H/Z-100 series machines as well as IBM-PC, TI Professional and Columbia PC.
List $395.00 SALE $195.00

ATS-64: Inexpensive way to upgrade your H/Z-89 to full 64K capacity. Price includes all parts needed. Requires basic soldering skill. **$49.95**

US ROBOTICS PASSWORD MODEM. This modem has automatic 300/1200 baud operation as well as answer/originate and auto dial feature. Hayes Smartmodem compatible. Full 2 year warranty.
List $499.00 SALE $349.00

CDR-FDC-880H 8" & Soft sector controller for H/Z-89 computers. This one controller allows the 89 to read and write all standard Heath/Zenith 8" and 5.25 formats. Will reformat your old hard sectored disks as soft sectored. Operates with or without the hard sectored controller.
List $395.00 SALE $369.00

DISK MINDER Attractive smoked plexiglass 5¼ diskette storage case. Holds 75 disks with dividers.
ONLY $23.50

Prices include shipping within the continental USA. Pennsylvania residents add 6% tax. Terms are check, money order or COD. Send orders to

ACCESS

P.O. Box 1053
Norristown, PA 19404
or call (215) 279-3320

AFFORDABLE is our first name, AFFORDABILITY is our aim.

n in BYTES. And "BYTES @" would leave on the stack the value contained in BYTES.

In Listing 1, on line 2 of screen 6 (COMPUTE.FILE.SIZE), "BYTES @" places on the stack the number of bytes to be stored. Then "256 / 1 + 256*" computes the number of bytes to be saved on disk (which must be an exact multiple of 256) and leaves that number on the stack. "FILE.SIZE !" stores the number in FILE.SIZE.

5) Because of the stack-oriented nature of Forth, post-fix notation or Reverse Polish Notation (RPN) is a prominent characteristic of Forth. That is, data must be on the stack before an operation which uses that data is performed. Thus, to add the numbers 2 and 3, enter "2 3 +". Their sum will then be left on the stack.

For illustration, refer to the computation of the number of bytes to be saved on the disk (COMPUTE.FILE.SIZE, noted above). The number on the top of the stack is divided by 256. The quotient is added to 1. And the result is multiplied by 256. (Note that, since only integer operations are performed, the quotient but not the remainder is put on the stack.)

This method of notation is reflected

Listing 1: TTY.FTH illustrates a number of the features of HForth-79. It simulates a teletype that has a paper-tape reader. It might also be used as a modem program with the Heath ET3400 Trainer or HERO I robot.

```
SCR #  1
  0 \ TTY     DISK FILE HANDLING WORDS                          26DEC83BME
  1 : STOP ;
  2 VARIABLE DFLT.BLOCK 4 ALLOT DFLT.BLOCK !" SYOTTY"
  3 VARIABLE NAME 16 ALLOT VARIABLE BUFF.SIZE
  4 VARIABLE BUFF.ADDR VARIABLE FILE.SIZE
  5 : CE DROP DSTAT @                          \ CHECK FOR DISK ERROR
  6         1 > IF CR ." Disk error:" DSTAT @ 3 .R THEN CR ;
  7 : OPENW  NAME DFLT.BLOCK 0 1 0 35 SCALL CE ; \ OPEN FOR WRITE
  8 : OPENR NAME DFLT.BLOCK 0 1 0 34 SCALL CE ;  \ OPEN FOR READ
  9 : READF 0 BUFF.ADDR @ BUFF.SIZE @ 1 0 4 SCALL CE ;  \ READ FILE
 10 : WRITEF 0 BUFF.ADDR @ FILE.SIZE @ 1 0 5 SCALL CE ; \ WRITE FILE
 11 : CLOSEF 0 0 0 1 0 38 SCALL CE ;            \ CLOSE FILE
 12 : DELETEF NAME DFLT.BLOCK 0 0 0 40 SCALL CE ; \ DELETE FILE
 13 -->
 14
 15


SCR #  2
  0 \  TTY     CONSTANTS INIT.PORT INIT.SCREEN SET.BUFFER  26DEC83BME
  1 224 CONSTANT PORT 96 CONSTANT LSD 0 CONSTANT MSD
  2 : INIT.PORT   0 PORT 3 + P! 0 PORT 1 + P!  \ DISABLE INTERRUPTS
  3     16 PORT 4 + P!                         \ SET LOOP BACK
  4     128 PORT 3 + P! LSD PORT P! MSD PORT 1 + P! \ SET BAUD
  5     30 PORT 3 + P!                         \ 7 BITS,EVEN,2STOP
  6     PORT P@ DROP                           \ READ ONCE
  7     6 MS PORT P@ DROP                      \ WAIT READ AGAIN
  8     0 PORT 4 + P! ;                        \ CLEAR LOOP BACK
  9 : INIT.SCREEN   25ON 1 25 HVCUR    \ TURN ON LINE 25, POS. CURSOR
 10     ."  Control   Read  PnchOn  PnchOff Dir    Delete"
 11     1 24 HVCUR ;
 12 : SET.BUFFER   MAXBUF BUFFERS CR  \ SET BUFFERS TO MAXIMUM
 13         MAXBUF 1024 * BUFF.SIZE ! \ STORE BUFFER SIZE
 14      ." Buffer size=" MAXBUF . ." K Bytes" CR \ DISPLAY SIZE
 15         FIRST BUFF.ADDR ! ; -->  \ STORE BEGIN ADDRESS OF BUFFE


SCR #  3
  0 \  TTY     CONSTANTS READ.PORT WRITE.PORT CHECK.PORT   11JAN84BME
  1 1 CONSTANT DR.MASK 32 CONSTANT THRE.MASK
  2 : READ.PORT  PORT 5 + P@ DR.MASK AND  \ CHECK DATA READY.
  3     IF PORT P@ ELSE 0 THEN ;          \ RETURN CHARACTER OR 0.
  4 : WRITE.PORT  BEGIN PORT 5 + P@ THRE.MASK AND \ THRE EMPTY?
  5     UNTIL PORT P! ;                   \ WRITE CHARACTER
  6 : WAIT   BEGIN READ.PORT DUP 0= WHILE DROP REPEAT EMIT ;
  7                \ WAIT FOR ECHO OF CHARACTER SENT.
  8 : GET.FILE.NAME   NAME 17 ERASE
  9     ." File Name? " NAME 16 EXPECT CR ;
 10 -->
 11
 12
 13
 14
 15
```

```
SCR #  4
  0 \ TTY   REGS LOADF ERASE.FILE                          11JAN84BME
  1 : CONTROL ." Enter key" KEY CR
  2         63 AND WRITE.PORT ;        \ SEND NEXT KEY AS CNTL CHAR.
  3 : DISK.TO.BUFF   OPENR READF CLOSEF ;
  4 : FIND.FILE.SIZE BUFF.ADDR @ @ ;  \ FIND SIZE OF FILE.
  5 : BUFF.TO.PORT
  6         FIND.FILE.SIZE BUFF.ADDR @ + \ SET LOOP UPPER LIMIT.
  7         BUFF.ADDR @ 2 +              \ SET LOOP LOWER LIMITS.
  8         DO I C@ WRITE.PORT WAIT 1 /LOOP ; \ SEND FILE TO PORT.
  9 : READ  GET.FILE.NAME DISK.TO.BUFF BUFF.TO.PORT ;
 10 : ERASE.FILE   GET.FILE.NAME DELETEF ;
 11 -->
 12
 13
 14
 15


SCR #  5
  0 \ TTY CHECK.PORT                                       11JAN84BME
  1 VARIABLE POINTER VARIABLE PUNCH.FLAG
  2 : STORE POINTER @ C!     \ STORE CHARACTER IN BUFFER.
  3         PUNCH.FLAG @ IF POINTER 1+!  \ INCREMENT IF STORING.
  4                      THEN ;
  5 : CHECK.PORT READ.PORT DUP
  6         IF DUP EMIT STORE  \ DISPLAY AND STORE IF CHARACTER
  7         ELSE DROP          \ WAS RECIEVED.
  8         THEN ;
  9 -->
 10
 11
 12
 13
 14
 15


SCR #  6
  0   \ TTY CLOSE                                          11JAN84BME
  1 VARIABLE BYTES
  2 : COMPUTE.FILE.SIZE   BYTES @ 256 / 1+   \ # OF SECTORS
  3         256 * FILE.SIZE ! ;      \  # OF BYTES TO SAVE.
  4 : BUFF.TO.DISK   COMPUTE.FILE.SIZE
  5         OPENW WRITEF CLOSEF ;
  6 : STORE.COUNT POINTER @ BUFF.ADDR @ 2 + -  \ FIND BYTE COUNT.
  7         DUP BUFF.ADDR @ !        \ PUT COUNT AT BEGIN OF BUFFER
  8         BYTES ! ;                \ AND IN "BYTES".
  9 : CLOSE.FILE PUNCH.FLAG @        \ TURN PUNCH OFF AND STORE
 10         IF STORE.COUNT             \ DATA ON THE DISK.
 11            BUFF.TO.DISK
 12            0 PUNCH.FLAG !
 13         ELSE ." No file open" CR
 14         THEN ;
 15 -->


SCR #  7
  0 \ TTY    CHECK.FKEY  PUNCH                             11JAN84BME
  1 : PUNCH   GET.FILE.NAME     \ TURNS PUNCH ON
  2         BUFF.ADDR @ 2 + POINTER !
  3         1 PUNCH.FLAG ! ;
  4 : CHECK.FKEY  10 MS ?TERMINAL
  5         CASE      0 OF 27 WRITE.PORT ENDOF \ NOT FKEY, SEND ESC
  6             ASCII S OF CONTROL ENDOF       \ F1 KEY
  7             ASCII T OF READ ENDOF          \ F2 KEY
  8             ASCII U OF PUNCH ENDOF         \ F3 KEY
  9             ASCII V OF CLOSE.FILE CR ENDOF \ F4 KEY
 10             ASCII W OF DIR ENDOF           \ F5 KEY
 11             ASCII J OF ERASE.FILE ENDOF    \ ERASE KEY
 12             ." Other F Key hit" CR
 13          ENDCASE ; -->
 14
 15
                                                          →
```

in other Forth words. For example, "132 0 DO... LOOP" would cause the words between DO and LOOP to be executed 132 times. Here, 132 is the loop limit and 0 is the beginning value of the index.

Conditional statements are also written in this form. Thus, "PUNCH.FLAG @ 0= IF... ELSE... THEN..." fetches the value in PUNCH.FLAG. If this value is equal to zero, the words between IF and ELSE are executed; otherwise the words between ELSE and THEN are executed. The ELSE portion is optional. (See, for example, CLOSE.FILE on screen 6.)

This has been a very cursory overview of Forth. But it should help you to follow the logic of the programs I have listed in this article. For more information, a book to look at is *Starting Forth* by Leo Brodie. I would suggest spending a couple of evenings scanning through it to give you a better feel for the basics of the language.

HForth-79

The version of Forth offered by SoftShop is HForth-79. It comes with a full-screen editor and an assembler. The assembler runs under the 8080 central processor so it is usable on both the H8 and H/Z89 computers. HForth-79 includes a full set of the features defined in the Forth-79 Standard. And it takes up less than 18K of memory.

HForth-79 is particularly well suited for use on Heath/Zenith computers. It takes good advantage of the special function keys and screen-addressing functions of the H/Z89 by means of a number of useful extensions to the features of standard Forth-79. (See the comments accompanying this article in "HForth-79 Extensions.") Versions are available for use under the Heath Disk Operating System (HDOS), as well as under CP/M and CP/M-85. However, most of my experience has been with the HDOS version; it is that version that I will discuss here.

HForth-79 vs. standard Forth-79

The primary difference between HForth-79 and standard Forth-79 is in the way the disk is accessed. As noted above, in both HForth-79 and Forth-79, the disk is partitioned into screens of 1,024 bytes each. Each of these screens consists of no more than 16 lines of 64 characters each.

Under Forth, it is the responsibility of the programmer to keep track of which screens contain text and data. And in standard Forth-79, the mini-floppy is considered one big file that contains both the absolute codes (Forth-79 object code) and all of the text and data files. This necessitates a lot of manual bookkeeping and careful assignment or reassignment of sectors on the disk.

Having those who program in Forth-79 do all this work presumably made the

```
SCR #  8
  0 \ TTY    CHECK.CONSOLE TTY                                  11JAN84BME
  1 : CHECK.CONSOLE  ?TERMINAL          \ CHECK FOR INPUT.
  2         CASE     0 OF EXIT ENDOF     \ NO INPUT.
  3                 10 OF 13 WRITE.PORT ENDOF \ REPLACE LF WITH CR.
  4                 27 OF CHECK.FKEY ENDOF  \ MAYBE FUNCTION KEY.
  5                 WRITE.PORT 0   \ SEND ANYTHING ELSE AND LEAVE
  6         ENDCASE ;               \ SOMETHING FOR ENDCASE TO DROP.
  7 : TTY    INIT.PORT 0 PUNCH.FLAG !
  8         INIT.SCREEN
  9         SET.BUFFER
 10         BEGIN
 11                 CHECK.PORT
 12                 CHECK.CONSOLE
 13         AGAIN ;
 14 ;S
 15


SCR #  9
  0
  1
  2
  3
  4
  5
  6
  7
  8
  9
 10
 11
 12
 13
 14
 15

HFORTH-79 VER 3  by SOFTSHOP                              07-Jun-84
```

Forth-79 package itself a lot easier to design. But it's not too convenient for those who use standard Forth-79. With HForth-79, however, SoftShop has done that work for us.

HForth-79 allows separate programs or data to be stored in named files. Rather than having to keep track of the location of an application program or data file, the programmer simply OPENs a file by name under a selected channel. (See the description of OPEN in "HForth-79 Extensions," accompanying this article.) Within a file, screens are numbered relative to the beginning of the file. Once a file is OPENed, HForth-79 will bring screens into memory automatically when they are referenced.

As you can see in the description of OPEN, up to five channels (0 through 4) can be open at once, allowing access to as many as five named files. Once a file has been OPENed under a given channel, further references to that file are made by its channel number. To select a particular screen within a given file, you simply add 1,000 times the channel number to the screen number. For example, to list screen 4 in the file OPENed under channel 3, you would enter "3004 LIST".

This method of disk input/output (I/O) may create a portability problem if you should want to transfer your programs to another version of Forth for another machine or disk format. But the

ANNOUNCING THE MODIFIER

A disk utility that modifies the CP/M BIOS to be able to read and write to a number of 5.25" CP/M disk types.

There is a growing need for the everyday user of computer systems to be able to take data files home from the office to continue to work on them. The computers at home and at work may both run a version of CP/M, but the disk structures may be incompatible. This is especially a problem in the 5.25" world. MODIFY 89 was designed to address this problem. MODIFY 89 makes the CP/M operating system access a specified 5.25" drive as one of the below disk types.
Disks placed in that drive that are of the specified type can be used as if they were one of the standard disk types accepted by the H8, H/Z89 or H/Z90 computers. Thus PIP, STAT, DIR and others will work for that disk also. The price for MODIFY 89 is $49.95.

MODIFY 89 is set for the following disk types:

- Access S.S. D.D.
- Cromemco S.S. D.D.
- DEC VT180 S.S. D.D.
- IBM PC/Zenith 100 (CP/M) S.S. D.D.
- IBM PC/Zenith 100 (CP/M) D.S. D.D.*
- Kaypro II S.S. D.D.
- Morrow Micro Decisions S.S. D.D.
- NEC PC-8001A S.S. D.D
- Osborne S.S. S.D.
- Osborne S.S. D.D.
- Otrona D.S. D.D.*
- Superbrain Jr. S.S. D.D.
- TI Professional S.S. D.D.
- TRS-80 Model I (Omnikron CP/M)
- TRS-80 Model III (MM CP/M)
- Xerox 820 S.S. S.D.
- Xerox 820-II S.S. D.D.
- Standard (Tests for H/Z37 and C.D.R. Disk types)

* = Double sided 5.25" drive required

S.S. = single sided, D.S. = double sided, S.D. = single density, D.D. = double density

Limitations: MODIFY 89 is not a disk duplicate program. It is currently available for use with an H/Z89 or H/Z90 computer that has an FDC-880H double density 8" and 5.25" controller, using C.D.R.'s BIOS V.2.9 or with an H8 computer using the FDC-H8 by C.D.R. Systems, Inc.

MODIFY 100 will soon be released for the Z100 line of computers at a price of $75.00.

Contact:

C.D.R. Systems, Inc.
7210 Clairemont Mesa Blvd., San Diego CA 92111
Telephone: (619) 560-1272
Or a C.D.R. Systems, Inc. dealer near you.

Circle #108 on Reader Service Card

Now for CP/M too!

HOME FINANCE SYSTEM VERSION 2

—An extensive Home Finance System that keeps track of checking, asset accounts (cash, savings, IRAs, CDs), and regular bill payments. Let your printer write your checks for you on **any** business-sized check (design your own check format).
—Checks have user defined codes and a separate flag for tax deductible items.
—Many reports, including listing all checks, or checks by codes or tax flag.
—System consists of 130 page users manual with 5 program disks (5-¼") and a sample data disk.

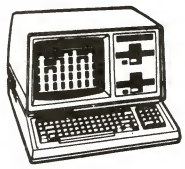
Hardware: H8/HZ89 (64K) or HZ100 with 2 disk drives. Any Heath®, Zenith® or other printer.
Software: HDOS 2.0 and MBASIC 4.82 for HDOS, or CP/M or CP/M-85/86 (Ver. 2.2) and MBASIC 5.21 for CP/M.
Order: Complete System $89† (specify hard or soft sector 5¼", HDOS or CP/M, HZ89 or HZ100). Manual alone $21.†
Master Card/Visa accepted, please include your phone number.

†Prices include shipping.

Jay H. Gold, M.D.
Jay Gold Software
Box 2024, Des Moines, IA 50310
(515) 279-9821

Circle #120 on Reader Service Card

HEATH/ZENITH SPOKEN HERE...



ZENITH LOW PROFILE COMPUTERS

ZF-101-31 Computer. Single 320K half-height disk drive, 192K RAM. Monitor sold separately. Color RAM set required for color sold separately .... Retail $3029.00, Payload $2479.00
ZF-111-22 Computer. Two 320K half-height disk drives, Color Graphics, 128K RAM. Monitor sold separately.
Retail $3499.00, Payload $2807.00
ZW-111-32 Computer. Internal 11 MEG Winchester hard disk drive, One 320K half-height disk drive, Color Graphics, 192K RAM. Monitor sold separately .
Retail $5499.00, Payload $4172.00

ZENITH ALL-IN-ONE-COMPUTERS

ZFG-121-32 Computer. Two 320K half-height disk drives, 192K RAM, Green screen monitor built in .
Retail $3729.00, Payload $2905.00
ZFA-120-22 Computer. Two 320K half-height disk drives, 128K RAM, Amber screen monitor built in.
Retail $3729.00, Payload $2887.00
ZWG-121-32 Computer. Internal 11 MEG Winchester hard disk drive, One 320K half-height disk drive, 192K RAM, green screen monitor .Retail $5599.00, Payload $4228.00

ZENITH IBM-COMPATIBLE COMPUTERS

ZF-151-21 Computer. One 360K half-height disk drive, 128K RAM, IBM bus with 4 open slots, color ready. Monitor sold separately . Retail $2199.00, Payload $1839.00
ZF-151-52 Computer. Same as above but with two disk drives and 320K RAM . Retail $2799.00, Payload $2257.00
ZW-151-52 Computer. Same as above but with 10.6 MEG Winchester Drive and one 360K half-height disk drive.
Retail $4799.00, Payload $3548.00
ZFA-161-21 Portable Computer. 9" Amber screen, Approximately 33 lbs. All other features same as ZF-151-21.
Retail $2399.00, Payload $1992.00
ZFA-161-52 Portable Computer. 9" Amber screen, Two 360K disk drives. All other features same as ZF-151-52 .
Retail $2999.00, Payload $2410.00

MONITORS FOR Z-100, Z-150 SERIES AND OTHER COMPUTERS

ZVM-135 High Resolution Color Monitor $569.00
ZVM-122 High Resolution Amber Monitor $165.00
ZVM-123 High Resolution Green Monitor..... $135.00

SOFTWARE CLOSE OUT FOR ZENITH H/Z-89

All are 5.25" sealed disks with registration cards and manuals. No more available after these are gone.
HSC-817-1 SuperCalc for CP/M, Hard Sector $60.00
HSC-837-1 SuperCalc for CP/M, Soft Sector $60.00

UPGRADE ACCESSORIES FOR Z-100 and Z-150 SERIES COMPUTERS

Color Graphics Upgrade. All memory chips required to update Z-100 Series computer for color. Installation instructions included..... $112.00 Complete.
Memory Upgrade. All memory chips required to upgrade Z-100 computers from 128 to 192 KB RAM. Upgrades Z-150 computers 64K additional for each kit ordered up to 320K maximum. Installation instructions included..... $63.00
Z-205 Memory Upgrade Card. Zenith 256K dynamic RAM for Z-100 series computers Retail $799.00, Payload $662.00
Second Internal Disk Drive. We can supply a matching drive to update your Zenith Computer to dual drives... Please inquire.

UPGRADE ACCESSORIES FOR H/Z-89 COMPUTERS

Magnolia Microsystems Double Density Controller. Soft-sectored disk controller. Supports up to four each 5.25" and 8" disk drives. Complete with cables, installation instructions and CP/M 2.242 . Payload price $354.00
Magnolia Microsystems 128K RAM Board. Add to your 48K H/Z-89 CPU memory for a total of 176K. For a limited time receive CP/M Plus (CP/M 3), a $350.00 value, at no additional charge . Payload price $446.00
Magnolia Microsystems Memory Upgrade Card. Installs in your H-89 to increase memory from 48K to 64K.
Payload price $68.50

EIGHT INCH DISK DRIVE SYSTEM

Two Tandon 8" TM848-2 Thinline, Double Density, Double Sided Drives in Deluxe Cabinet with Heavy Duty Power Supply and Cooling Fan, 2.4 MEG Storage Total. With Cable Ready for any H/Z-100 or H/Z-89 with Magnolia DD Controller..... $1135.00

INTERNAL DUAL DRIVE SETUPS FOR THE H/Z-89 COMPUTER

Each setup includes two half-height double-sided disk drives and all hardware and connectors required to mount inside your H-89. Included is a shield/case which is required for the 96 TPI drives but may be deleted (deduct $30.00) from orders for the 48 TPI setups. If this case is deleted you must drill four mounting holes in your existing drive mounting shield.
National JA551-2 Setup, 48 TPI, 6 MS seek..... $414.00
Mitsubishi 4851 Setup, 48 TPI, 6 MS seek..... $492.00
Mitsubishi 4853 Setup, 96 TPI, 3 MS seek..... $548.00

DISK DRIVES

We recommend the 5.25" Tandons for replacements only. For new setups, you should purchase the newer generation, more reliable and less expensive half-height drives. As for eight inch, we think the Tandons are the best and recommend them highly. The Panasonic/National drives are made in Japan by Matsushita. This is the same company that makes the Shugart SA445 and we can not tell the difference except by price. The Mitsubishi drives are now standard in all the new Zenith computers.
Tandon TM848-2, 8" Thinline, DS, DD, 48 TPI..... $445.00
Tandon TM100-1, 5.25" SS, DD, 48 TPI..... $194.00
Tandon TM100-2, 5.25" DS, DD, 48 TPI $245.00
Tandon TM101-4, 5.25" DS, DD, 96 TPI $295.00
Mitsubishi M4851 5.25" Half Height, DS, DD, 48 TPI... $225.00
Mitsubishi M4853 5.25" Half Height, DS, DD, 96 TPI... $255.00
National JA551-2 5.25" Half Height, DS, DD, 48 TPI... $185.00

POWER SUPPLIES AND CASES FOR DISK DRIVES

For standard and half-height disk drives. Rugged steel construction with heavy duty power supplies. Purchase with drives and we will configure and install in case for you.
Single 5.25" unit for standard drive ..... $ 68.00
Dual 5.25" unit, specify Standard or Half Height... $ 92.00
Dual 8" unit with fan, for thinline drives $225.00
Face plate for single drive in dual case ..... $ 8.00

Your satisfaction is guaranteed. All hardware carries a 90 day warranty. Prices are discounted for payment with order. VISA and MASTERCARD orders please add 3%. Add $5.00 to all orders for handling and shipping, we pay the balance. Call us, we will be happy to answer your questions. THANK YOU.

VISA

PAYLOAD COMPUTER SERVICES
CHARLES C. PORTER, Proprietor
15006 SUN HARBOR, HOUSTON, TEXAS 77062
PHONE (713) 486-0687

MasterCard

Circle #147 on Reader Service Card

chance of that becoming a problem is probably well worth the simplicity it creates.

Important extensions in HForth-79

The comments titled "HForth-79 Extensions" give extensions to standard Forth-79 which I found particularly interesting. While I have tried to make this list self-explanatory, some of the extensions deserve special mention.

One group of extensions takes advantage of the '89's console functions (graphics mode, cursor control, etc.). I've seen a number of articles on how to use these functions in BASIC; but in HForth-79, the work is already done for you.

Among the device-related words, I have found SCALL to be particularly useful. With it, you can execute any of the HDOS system calls (SCALLs). For example, I have used it to open and close disk files using file names supplied by the user during program execution. If a disk I/O error should occur during the execution of an SCALL, the HDOS error number will be available in the HForth-79 variable DSTAT.

SAVEF, TURNKEY, and DESTROY (under Miscellaneous) are another useful set of words. SAVEF allows you to permanently attach your own extensions to the language, thereby modifying it to your particular applications. With TURNKEY and DESTROY, you can create programs that run on their own, as if they had been compiled. You can then distribute these programs without either giving away a working copy of HForth-79 or expecting the user to have one already.

I might also mention here two additional sets of extensions which I don't discuss in "HForth-79 Extensions." These add new string-handling functions and floating-point arithmetic. Forth-79 does a reasonable job with strings, but the string-handling functions in HForth-79 will allow you to manipulate them in an easier fashion—very similar to how some BASIC commands do so.

The floating-point extensions add 49 new words for input and output of floating-point numbers. All basic mathematical operations, including all of the trigonometric and hyperbolic functions, can be performed. Most of the floating-point extensions are written in assembly language and should execute quite quickly.

The screen editor

The screen editor included with HForth-79 is another nice feature. The "standard" editor for Forth is a line editor. However, most versions sold now include a screen editor. And HForth-79 is no exception.

The editor contains all of the usual cursor-control, insert, and delete functions. It has a search function to find occurrences of a requested string and a buffer for temporary storage of text being moved from one area to another.

A nice feature which is useful for program documentation is the stamp function. The "stamp," usually the date and your initials, may be automatically placed at the end of the first line of each screen and is updated each time the screen is modified. (In Forth, the first line of each program screen is typically used for comments and documentation.)

All of the more than two dozen editing commands are available either through the numeric keyboard or through the function keys (which are nicely labelled by the 25th line of your screen).

Documentation

I found the documentation to be quite well written and thorough. It includes 25 pages of printed material and the equivalent of another 44 pages of material on the distribution disk. The documentation describes how HForth-79 differs from standard Forth-79 and explains how to use HForth-79's unique features.

The documentation does not attempt to teach you Forth. It does, though, include notes to be used with Leo Brodie's *Starting Forth* and documents page-by-page any differences between HForth-79 and Brodie's book.

One aspect of the documentation that could be improved is the explanation of error messages. When HForth-79 detects an error, a short message is given. Usually these messages are self-explanatory, but some are quite cryptic. It would have been nice if the documentation listed each error message with a short description of the error condition.

The sample program

The program in Listing 1 should help you to get a better idea of how some of these features of HForth-79 can be used. I wrote this program to use my H89 as a terminal for a small software-development system to produce programs to run on Motorola's 6800 central-processor unit (CPU) chip.

This development system has a simple monitor program in read-only memory (ROM) which expects to receive simple commands from a teletypewriter (TTY) through a paper-tape punch/reader. My program simulates a TTY that has a paper-tape reader.

Input from the 6800 through the serial port (located at 340Q, decimal 224) is displayed on the screen of the '89. Characters entered at the keyboard are sent to the 6800 through this port. The '89's function keys are used to "turn on the tape reader" or to "turn the punch on" (or off) as well as to perform a few other functions.

While this program is designed

SAN DIEGO SCIENTIFIC

Z-FIVE Z-five Z-FIVE Z-five Z-FIVE

Z-FIVE is the game that you can play to solve the age old question of who is smarter, you or your Z-100 computer. This game will bring out the hidden personality of your machine while it unmercifully whups up on you. ZEGOR, (that's what we call him) is quarenteed to reduce you to lowest grade wimp. You may never think of your computer as just a dumb machine again! Especially when his moves are made within 15 seconds!

Z-FIVE is based on the Japanese game of GO whereby a player and an opponent (human or otherwise) compete by placing five colored pieces in a row either horizontally, vertically or diagonally on a playing grid. The game itself is a strategic exercise in two dimensional thought development. To work best this game requires a Z-100 with 192K memory, full color memory and a color monitor.

Z-FIVE is only $30.00 including shipping.
CA resident add $1.80 sales tax.
Checks or Money Orders only please.

mail your order to:

SAN DIEGO SCIENTIFIC
Micro Products Division
815 Third Avenue, #301
Chula Vista, CA 92011
(619)425-2262

$100.00

REWARD

Anyone purchasing Z-FIVE from this ad and prior to 9-30-84 is qualified to compete in the first national Z-FIVE olympic competition. Details are included in copies of Z-FIVE shipped during this period. The first prize will be $100.00 cash.

Circle #159 on Reader Service Card

Make your Heath® or Zenith computer system even more useful

and get a FREE directory of over 350 sources of support for your Heath or Zenith computer.

Subscribe to **Buss: The Independent Newsletter of Heath Co. Computers,** and also receive the directory *at no additional cost.*

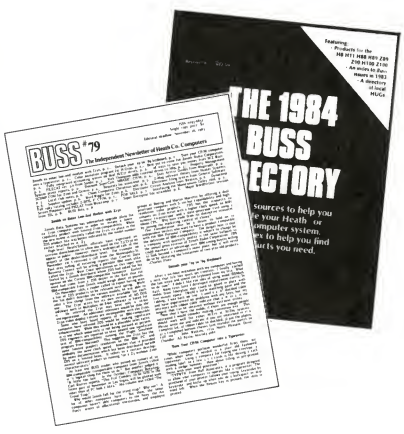
In each and every issue, you'll find out who the independent suppliers supporting Heath/Zenith are, what they're doing, what other users are doing, and where to get the products and information you need—all in one newsletter which comes to you twenty times a year, by first class mail.

As a subscriber to *Buss,* you can learn what other users and independent suppliers have to say about:

☐ H8	☐ printers	☐ business applications	☐ utilities
☐ H/Z89	☐ terminals	☐ home/hobby applications	☐ Z-DOS
☐ Z100	☐ disks and drives	☐ games	☐ HDOS
☐ compatible hardware	☐ compatible software	☐ graphics	☐ CP/M

Twenty times a year, you'll get the newsletter which helps you:

- Learn what new products are being developed and where to get them, in *Buss*'s new product announcements.
- Benefit from the advice of users when you write in to *Buss*'s Assistance Wanted column.
- Save money as you improve your system! *Buss* has a free "For Sale" listing for Heath/Zenith users.
- Avoid bugs in your system as you read how other users have solved problems they've found.
- Find out the news in the Heath/Zenith community which affects you and your system.
- Discover other users in your area through the Local Club Notes section of *Buss.*
- Get unbiased coverage of your system from the oldest independent newsletter for Heath/Zenith users. *Buss* has grown with the Heath/Zenith community, and has always been committed to supplying information particularly for the Heath/Zenith *user.*



And, as a bonus with your *Buss* subscription, you'll receive your FREE copy of *The 1984 Buss Directory*—a reference tool which provides you with information on over 350 sources of independent support for your Heath/Zenith system.

The 1984 Buss Directory is a $12.50 value—and it's yours FREE with your subscription to *Buss*! We'll send it to you by first class mail as soon as your subscription order is received.

Order your subscription today, and start getting more use from your Heath/Zenith system!

Use this coupon, and mail your order today to:
Buss, Dept. S12
716 E Street, S.E.
Washington, DC 20003
202/544-0900

Your satisfaction with *Buss* is completely guaranteed. If at any time you are not satisfied, your money will be refunded—in full.

Yes! Sign me up for *Buss*, and send me my free copy of *The Buss Directory*!

I want:
☐ 30 issues for $38 ($55 overseas)
☐ 20 issues for $28 ($40 overseas)
☐ 10 issues for $18 ($24 overseas)

☐ Payment enclosed (checks must be in U.S. dollars payable on a U.S. bank).
☐ Bill me.
☐ Charge my: ☐ Visa ☐ MasterCard

Name_____
Address _____
_____
_____

Card # _____
Expiration date_____
(MC code #_____)

Buss, Dept. S12, 716 E Street S.E., Washington DC 20003

Circle #107 on Reader Service Card

MEMO

TO: ZENITH Z-100 & HEATH H-100 USERS

FROM: PIICEON INC.

SUBJECT: IMMEDIATE AVAILABILITY OF 10 MB & 20 MB HARD DISKS AND 256 KB MEMORY BOARDS

Piiceon Inc., a leader in field-proven peripherals for Zenith and Heath microcomputers, is now filling orders for its highly regarded Winchester hard disk drives and 256 KB memory boards.

Piiceon's two Winchester subsystems — the HZD-10, with 10 MB of disk storage, and the HZD-20, with 20 MB — are complete turnkey add-ons for the Z-100 and H-100 systems. Both external units are complete with stylish enclosure, power supply, cables, software and Piiceon's proprietary D-100 controller board.

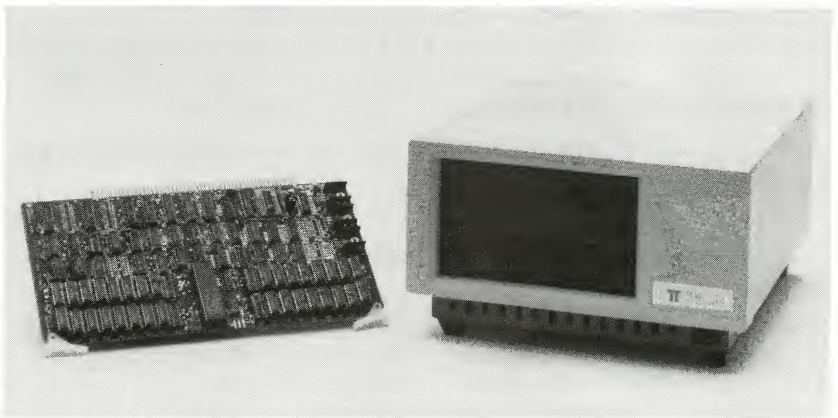
The suggested retail price for the 10 MB subsystem is $2,395 and for the 20 MB subsystem, $3,325. And both are covered by a 90-day warranty.

Piiceon's 256 KB dynamic RAM board, the SUPERAM™ 50A/ZD is custom configured for the Z-100 and H-100 systems. It operates with both the 8085 and 8088 CPUs.

The suggested list price for the SUPERAM™ 50A is $785.

Piiceon has earned a strong reputation among Z-100 and H-100 users for the reliability and compatibility of its peripherals. And now, it's becoming known for product availability and fast delivery.

For the name of your nearest dealer, please call or write Piiceon's director of marketing.



PIICEON

2114 Ringwood Ave., San Jose, CA 95131 408/946-8030
Telex 171-135 Ans: Mission SNTA

Circle #244 on Reader Service Card

specifically for my small development system, it might also be used as a modem program, with the Heath ET3400 Trainer, or possibly with the HERO I robot. If you decide to use this program, I suggest that you build in some additional error checking. I left most error checking out for the sake of simplicity.

I have tried to make the program as readable as I could. But some explanation would probably be helpful and would give me a chance to point out some examples of the features of HForth-79. For those of you who are new to Forth, I hope the section above, "Reading a Forth program," may prove helpful in reading the next section.

General-purpose screens

The first three screens are fairly general-purpose screens that I have used in several other programs with little change. In the first screen, I define several words for disk I/O. It gives an example of the use of SCALL.

The second screen defines several words that are used to initialize the '89 (communications rate, etc.) at the beginning of the program. The first word defined is INIT.PORT. This initializes the serial port, in accordance with the directions given in the HDOS manuals.

INIT.SCREEN is an example of the use of some of the screen-control words supplied in HForth-79. It simply puts labels for the function keys on the 25th line. SET.BUFFER sets up a buffer area in memory for storing data going to or from the disk.

The third screen defines words that are related to I/O through the serial port (READ, FIND.FILE.SIZE, etc.).

Program description

To understand the rest of the program, it is best to go to the last screen. The word TTY, listed there, indicates the basic operation of the program.

In essence, the program first carries out the initialization described in screen two and then enters an endless loop, alternately checking the serial port and the keyboard.

In the loop, the program checks for any input at the serial port (CHECK.PORT). If a character has been received, it is sent to the screen. If the "punch" has been turned on, the character is stored. The program then continues to CHECK.CONSOLE.

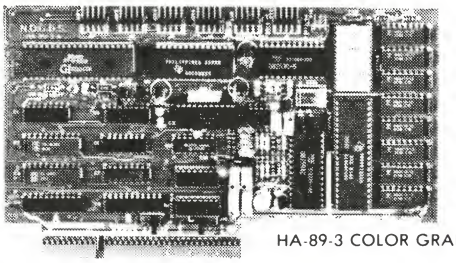
Use of the CASE structure

CHECK.CONSOLE checks for characters entered at the keyboard. This checking is done with a CASE program structure.

In this structure, the character is compared to several possible inputs which require special handling. These special characters and their responses

H-8, H/Z-89, and Z-100 ACCESSORIES

PUT COLOR GRAPHICS ON YOUR HEATH/ZENITH COMPUTER



HA-89-3 COLOR GRAPHICS BOARD

HA-89-3 COLOR GRAPHICS BOARD **$299.00**

This board will expand your H/Z-89 computer to include color graphics and sound effects with support for both HDOS and CP/M. High level application support under GRAPH-PAC-II (see description below), and all for a price much lower than other boards offering much less! Uses the advanced TMS-9918A Color Video Generator which displays brilliant color graphic output on any video device accepting NTSC signals. Included is a documentation package which contains a distribution disk with sample programs and driver routines, a 275-page manual with detailed information on installing and using the HA-89-3, a schematic, manufacturers' data sheets for the major components of the board, and a list of vendors who have commercial software packages available for this board. The standard board includes:

- Eight Analog/Digital Converter Channels
- Sound Generation for Special Effects
- 16-Bits of Parallel I/O
- Three Counter Timer Channels
- Priority Interrupt Controller

Optional Features Include:

- **Voice Synthesis using the VOTRAX SC-01A chip** **$130.00**
- **Am9511A Arithmetic Processor (floating point and trig functions)** **$175.00**
- **Two 12-Bit Digital/Analog Converters** **$110.00**
- **Joysticks (each)** ..... **$ 14.00**

Add $15.00 extra if options are not purchased with basic board.)

Please specify operating system (HDOS or CP/M) and disk format (any standard Heath format).

HA-8-3 COLOR GRAPHICS BOARD **$299.00**

Create color graphics and sound effects on your H-8 computer. Supports HDOS and CP/M and high level applications with GRAPH-PAC-II (see description below). Uses the advanced TMS-9918A Color Video Generator which displays brilliant color graphic output on any video device accepting NTSC signals. The programmable sound generator makes a wide variety of sounds. Included is a documentation package which contains a distribution disk with sample programs and driver routines, a 250-page manual with detailed information on installing and using the HA-8-3, a schematic, manufacturers' data sheets for the major components of the board, and a list of vendors who have commercial software packages available for this board. The standard board includes:

- Eight Analog/Digital Converter Channels
- Sound Generation for Special Effects
- 16-Bits of Parallel I/O

Optional Features:

- **Am9511A Arithmetic Processor (floating point and trig functions)** **$175.00**
- **Joysticks (each)** ..... **$ 14.00**

Please specify operating system (HDOS or CP/M) and disk format (any standard Heath format).

JOY-1 JOYSTICKS ..... **(each) $ 14.00**

For use with the HA-89-3 and HA-8-3 Color Graphics Boards described above. Please specify for which board you will be using it.

Z-GRAPH-100

The premier graphics support system for your Z-100.

Supports all video and memory configurations.
- 640 X 480 interlace
- 640 X 240 non-interlace
- 640 X 240 non-interlace-Sync
- Monochrome, 32K Color or 64K Color Memory

****

Compatible with most popular compilers:
MS-FORTRAN, MS-Pascal, MS-COBOL, Z-BASIC, MASM, C (Computer Innovations)

****

Capabilities are:
Plot, Draw, Circle, Arc, Move, Window, View, Newpage, Foreground and Background Color, Line Color, Absolute and Relative Vectors, Seventeen Standard Line Styles, User Definable Line Styles, Fast Polar to Rectangular Conversions, Three Area Fill Routines, Standard and User Defined Fonts in Eight Character Sizes and Four Writing Directions, ASCII and Greek Character Sets, Provides Special Drawing Modes to Support "Rubber Band" and Moving Marker or Cursor Applications.

$89.00

H-8 MUSIC SYNTHESIZER SYSTEM ..... **$ 89.00**

Expand your H-8 computer to include the latest pop hits! This board connects to your stereo system with two shielded cables (included). A true D/A converter provides excellent 27.5-3300 Hz frequency response, up to 9 harmonics. 4-part harmony in stereo. Enter any song, right from sheet music. Full documentation included. Requires min. 24K memory, H-17 floppy, terminal. Please specify operating system (HDOS or CP/M) and disk format (any standard Heath format).

OPTIONAL 8-VOICE MUSIC COMPILER ..... **$ 39.00**

Allows your system to produce 8-part harmony in stereo rather than 4-part described above. Requires 4 MHz Processor. May also be ordered separately for existing HA-8-2 boards.

GRAPH-PAC-II ..... **$ 39.00**

A software support package for the HA-89-3 and HA-8-3 Color Graphics Boards described above.

- Supports calls from:

  ASSEMBLY LANGUAGE (requires M-80)
  BASIC-80 (interpreter or compiler)
  TINY PASCAL
  PASCAL/MT+
  FORTRAN-80
  COBOL-80
  C/80 Ver. 2.0 (requires M80 and L80)

- Primitives and high level support
- Generates circles, lines, points, characters and bar graphs
- High speed object movement and collision detection
- User definable character fonts

Package includes your choice of one of the above languages. Additional languages may be ordered for $15.00 each. Please specify language(s), disk format and operating system.

PASCAL/MT+ for HDOS **$350.00**

Contains six major components: compiler, linker, debugger, disassembler, librarian and distribution package. The recommended environment is 64K of memory (the Pascal/MT+ compiler will use the lower 8K for additional symbol table space), three 100K disks or two extended density disks.

- Supports entire ISO standard (DPS/7185)
- Includes variant records, sets, record files and procedure passing
- Modular compilation with external variables
- Overlays and chaining through programs
- Interrupt procedures and absolute variables
- Inline assembly code
- Generates native Z80 or 8080 Code.

Available in any Heath format, please specify.

NEW ORLEANS GENERAL DATA SERVICES

Ordering Information: Products listed are available from NOGDS, 7230 Chadbourne Drive, New Orleans, La. 70126. Check, Money Order, VISA or MasterCard accepted. Phone orders call (504)241-9495. Add $5.00 shipping (VIA UPS unless otherwise specified).

H8, H89 and HDOS are registered trademarks of Heath Corporation, Benton Harbor, Michigan. CP/M and PASCAL/MT+ are registered trademarks of Digital Research, Inc. Fortran-80 and COBOL-80 are registered trademarks of Microsoft.

Selected HForth-79 Extensions

This glossary has been extracted from the HForth-79 documentation, with permission. It contains the descriptions of some of the extensions to Forth-79 that are provided in HForth-79.

A number of these words affect the stack. In such cases, the word will be followed by information inside square brackets. This will show the action of the procedure on the parameter stack.

To the left of the three short dashes (---) are symbols to indicate the condition of the stack *before* execution; and to the right are symbols to indicate what remains on the stack *after* execution.

When two or more parameters are on the stack, either before or after execution, the top of the stack is shown to the right: i.e.,

2nd top --- 3rd 2nd top

The symbols, etc., I'll use here include:

addr (from 0 to 65535)—This is a value representing the address of a byte of memory space. This addressed byte may represent the first byte of a larger data field in memory.
b (from 0 to 255)—a value representing an 8-bit byte. When in a larger field, the higher bits are zero.
flag—a numerical value with two logical states; zero = false, non-zero = true.
n (from –32,768 to 32,767)—a 16-bit signed integer number.
<name>—An arbitrary Forth word accepted from the input stream. This refers to text from the input stream, not to values on the data stack. If the input stream is exhausted before encountering <name>, an error condition exists.

Control-structure words

CASE [n1 ---]
Used in a colon-definition in the form:

```
<name> . . . . . .
   CASE
    n2 OF . . . ENDOF
    n3 OF . . . ENDOF
    .
    .
    nx OF . . . ENDOF
    [otherwise-words]
   ENDCASE
```

When executed in the course of a program, n1 <name> will search the various CASE... OF... conditions and if n1 matches any of the n2 through nx CASEs, the words between OF . . . ENDOF will be executed and then program execution will continue following the ENDCASE. If no match occurs, the otherwise-words (if any) will be executed. After this, n1 is removed. CASE has no run-time effects.

GODO [n ---]
Used in a colon-definition in the form:

n GODO word0 word1 . . . wordX THEN

The nth word between GODO and THEN will be executed. Program execution will then continue after the THEN. If n is less than or equal to zero, word0 will be executed; if n is 1, word1 will be executed, and so on. If n is greater than or equal to X, wordX will be executed.

Defining words

ARRAY (or **CARRAY**) **[n ---]**
Executed in the form:
n ARRAY <name> (or n CARRAY <name>)
to create a dictionary entry for <name> and allot n one- or two-byte elements in the parameter field. Executed in a program in the form "n <name>" which places the storage address of the nth element of the array on the stack.

TABLE (or **CTABLE**)
Executed in the form:
TABLE <name> (or CTABLE <name>)
to create a dictionary entry for <name>. No bytes are ALLOTed in the parameter field. Elements are created with "," (comma) or ",C" (comma-C). When executed in the course of a program, n <name> will place the value of the nth element on the table on the stack.

H/Z89 console functions

25ON, 25OFF
Turn 25th line on or off.

CURON, CUROFF
Turn cursor on or off.

HAKM
Enter alternate keypad mode. HXKM exits this mode.

HEGM
Enter graphics mode. HXGM exits this mode.

HEKS
Enables the keyboard-shift mode. HXKS exits this mode.

HERV
Enter reverse-video mode. HXRV exits this mode.

HEWA
Enables wrap-around. HXWA disables it.

HVCUR [n1 n2 ---]
A Heath console I/O command. It positions the cursor at the horizontal column specified by n1 and the vertical row specified by n2.

Device-related words

CLOSE [n ---]
A Heath disk I/O command. This command closes channel n and prevents further writing to it. The command does not automatically write any UPDATEd screens. See SAVE-BUFFERS and OPEN.

CRT
Selects TT: as the only output display device. Cancels the PRINT command.

DELETE
Heath disk I/O command. Used in the form:

DELETE <name>

to delete an HDOS file. Note that the file must not be open.

DIR
Heath disk I/O command. Directory of filenames on the disk mounted in the current drive. See DR#.

DISMOUNT
Heath disk I/O command. DISMOUNTs the disk in the current drive. No message is issued. No files may be opened. STAND-ALONE must be set to dismount the system disk.

DR# [n ---]
Heath disk I/O command. Makes n the current drive. (n = 0 to 8)

MOUNT
Heath disk I/O command. MOUNTs the disk in the current drive. No message is issued unless there is an error.

OPEN
Heath disk I/O command. Used in the form:

n OPEN <name>

The OPEN command is used to open an HDOS file specified by <name> under the channel specified by n. <name> may be "fully qualified" or use default values. The default device is the current drive. (See DR#.) And the extension is "FTH". A bell will warn you if the file is "read only." Up to five channels (0 through 4) may be opened at one time. An error exists if the current channel is already in use. See DR#, CLOSE.

P! [b port# ---]
8080 or Z80 I/O port store. Outputs byte b from stack to port#.

P@ [port# --- b]
8080 or Z80 I/O port fetch. Inputs byte b to stack from port#.

PRINT
Heath printer I/O command. Selects the PRINTer as an output device. Output sent to the console will also be sent to LP:. The high bit is masked (ignored or set to zero). To unmask this bit, set the variable $EPG (enable printer graphics) to 1.

SCALL [n1 n2 n3 n4 n5 n6 --- n7]
Heath HDOS SCALL. This command performs an HDOS SCALL where: n1 = contents of the CPU's memory register HL; n2 = contents of DE; n3 = contents of BC; n4 = contents of

are listed between CASE and ENDCASE.

The first "special character" is a null (0 decimal)—that is, no character at all. This triggers an exit from the CASE structure with no further action.

A line feed (10) causes a carriage return (13) to be sent to the port. An escape (27) requires further checking to see whether a function key has been pressed (CHECK.FKEY).

If it is neither a null, nor a line feed, nor an escape, then the character is sent directly to the serial port.

If an escape (27) character is received, it may be the first character of a sequence sent by a function key. CHECK.FKEY, in screen 7, determines whether a function key has been depressed and directs program execution to the appropriate routine. It does this by using the CASE program structure again.

After a 10 millisecond pause, CHECK.FKEY checks for a character from the keyboard and then enters the CASE structure. If an input was received, it is compared with the characters that correspond to the function keys and executes the appropriate routine. If no input was received, CHECK.FKEY assumes that the escape character was sent by the escape key and sends the escape character to the serial port.

Function keys

Since some control characters will affect the operation of the program, I needed a way to send them without their interfering with its execution. Using the f1 special-function key allows me to send control characters to the serial port. Here, I programmed the f1 key to send the control character corresponding to the next key that is struck; pressing f1 and then K, for example, would cause CTRL-K to be sent. This is accomplished by the word CONTROL, defined in screen 4.

The f2 key executes READ, also defined in screen 4, which sends a file from the disk to the serial port. To do this, READ first requests the name of the file to be sent (GET.FILE.NAME). The file is then read from the disk to the buffer in memory (DISK.TO.BUFF) and from the buffer to the serial port (BUFF.TO.PORT). The number of bytes to be sent is found by reading the first two bytes of the data.

Each time a character is sent, WAIT is entered, causing the computer to wait for the character to be echoed back to the '89 from the 6800. WAIT ensures that the data is not sent faster than it can be processed by my development system.

Turning the punch on and off

The f3 key is used to "turn on the punch" or to begin storing data on disk. After requesting a name for the file, PUNCH assigns a value to POINTER and stores a value of "true" (1) in PUNCH.FLAG, indicating that the "punch" is on. POINTER always contains the address where the next character is to be stored. At this point, its value is set to the beginning of the buffer area plus two. Eventually, the size of our file will be stored in these first two bytes.

A closer look at CHECK.PORT at this point will show how the data is actually stored. When a character is received from the serial port, it is always displayed and stored at the memory location indicated by POINTER. But POINTER is incremented after each character is stored only if PUNCH.FLAG has a value of "true."

The f4 key "turns off the punch." CLOSE.FILE, screen 6, first determines that the punch is indeed on by checking PUNCH.FLAG. If it is off, a message to that effect is displayed on the screen. If the punch is on, the number of data bytes in the file is stored in the first two bytes of the buffer. HDOS requires an exact multiple of 256 bytes to be stored in any file. COMPUTE.FILE.SIZE determines the multiple. The data is then stored and PUNCH.FLAG is set "false" (0).

The f5 key causes a directory of the disk currently mounted to be displayed (DIR). The erase key allows you to delete files from the disk (ERASE.FILE in screen 4).

Ready to start Forth?

As noted above, this program can be used for a number of purposes. The primary reason that I included it, though, was to illustrate how some of the features of Forth and, in particular, HForth-79 can be used.

I have found working with HForth-79 to be a big step up from programming in BASIC. I recommend it to anyone interested in writing fast, compact code.

Ordering Information

HForth-79, $34.95
HForth-79 Plus, $45.95
HForth-79 includes the full Forth-79 standard; HForth-79 Plus adds floating-point math set. Specify CP/M, CP/M-85, or HDOS.
Overseas orders add $3 (payment in U.S. funds).
SoftShop
35 Shadow Oak Drive
Sudbury, MA 01776
617/443-9693

the accumulator, register A; n5 = 1 enables error message (0 disables); n6 = number of the SCALL; n7 = contents of accumulator after SCALL.

Disk-block words

BUFFERS [n ---]
Executes SAVE-BUFFERS and then executes EMPTY-BUFFERS. Allocates n buffers in memory, limiting n to not less than 2 and not greater than MAXBUF.

FIRST [--- n]
A constant that leaves on the stack the address of the first (lowest) block buffer. Note that BUFFERS will change FIRST.

MAXBUF [--- n]
This leaves on the stack the maximum number of 1,024-block buffers which would currently fit in memory.

Miscellaneous and utility words

#IN [--- n]
Use this to input a number, n, to the stack from the keyboard.

DESTROY
Destroys some key Forth compiler words, yet still allows Forth compiled programs to execute normally. Used in conjunction with TURNKEY to allow an application program to be used commercially without "giving away" HForth-79.

DUMP [addr n ---]
Prints a hexadecimal and ASCII dump, 16 bytes per line, starting at addr; prints at least the next n bytes.

MS [n ---]
Gives a delay of approximately n milliseconds.

ONERR
Used in the form:

ONERR <name>

Aborts which take place after this word will resume execution with <name> instead of going back to HForth-79, the normal outer interpreter. Typically, <name> should clear the stacks and return to a user menu. It should not be invoked until after the normal Forth bootup.

SAVEF
Heath disk I/O command. SAVEForth will save the current dictionary on disk. When SAVEF is executed, HForth-79 will request a file name. When this new version of HForth-79 is later run, it will contain the extended HForth-79 dictionary. The default drive is SY0: and the default extension is .ABS.

TURNKEY
Used in the form:

TURNKEY <name>

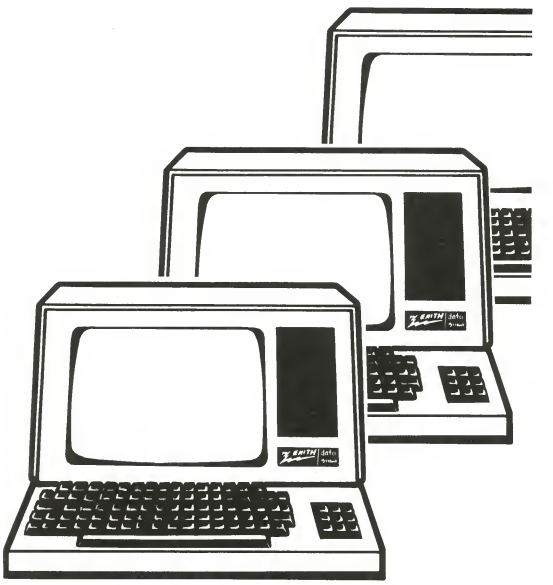
When the dictionary is saved using SAVEF and then later booted-up, TURNKEY will cause execution to begin with the word <name>.

YES/NO [--- flag]
This will print "(Y/N)?", then leave a "true" flag on the stack if the next key typed is a "Y".

****
The backslash is a comment character to be used inside a program screen only (not a data screen). It causes all subsequent characters on its line to be ignored. During the LOADing process, interpretation will skip to the next line. Must be followed by a space.

Support and More

Energize your tired old computer with...



H8 PRODUCTS

The Most Extensive Line of Hardware Support for the H8®

- **DG-80/FP8**
  Z80® based CPU including the powerful FP8 monitor — both only $199.00. The acclaimed FP8 monitor package is included with the DG-80 CPU.
- **DG-64D/64K RAM Board**
  Reliable, Low Power, High Capacity Bank-selectable RAM
  Priced from $233.00 (0K) to $299.00 (64K)
- **DG Static 64**
  Fully Static, High Capacity, Bank-selectable RAM. Also can be used as EPROM/PROM board (2716 type EPROMS). Priced from $199.00 (0K) to $499.00 (64K).
- **DG-32D/32K RAM Board**
  Low cost, Dependable RAM for the H8 32K Version Only $179.00.
- **DG-ADP4**
  H17-4 MHz disk adaptor — $19.95

THE SUPER 89

The DG SUPER 89 is a replacement central processor board for the Heath/Zenith 88-89 series of computers. The DG SUPER 89 offers advanced features not available on the standard Heath/Zenith 88-89 such as 4 MHz operation, real-time clock, optional AM9511A arithmetic processor, up to 256K of bank selectable RAM with parity check, and HDOS, CP/M and MP/M compatibility. By incorporating the state-of-the-art technology of the Z80, the DG SUPER 89 offers the user increased speed and system reliability for years to come. Super 89 BIOS included. Full compatibility with all Health/Zenith software and hardware products is designed into the DG SUPER 89. Priced from $829.00 (128K) to $989.00 (256K).

HEARTBEAT

The DG Heartbeat is a compact computer system designed to be hardware and software compatible with the popular Heath/Zenith Z89/90 computer product line. The Heartbeat offers advanced features not found on the standard Heath/Zenith computer such as 4 MHz operation, real-time clock/calendar, two RS-232 serial ports, five peripheral expansion slots, 128 Kbytes (expandable to 256 Kbytes) parity checked RAM and provisions for an optional AM9511 Arithmetic Processor. Compatible with HDOS, CP/M and MP/M II (Multi-user) operating systems. Super 89 BIOS included. The Heartbeat may be used with most popular video terminals on the market although the Heath/Zenith H/Z19, H/Z29 and ZT-10/11 video terminals are recommended for full Heath/Zenith software compatibility. The Heartbeat cabinet design provides for inclusion of hard and/or floppy disk drives as well as other desired peripheral interfaces and is color-coordinated for use with the Zenith Z29 and ZT-10/11 video terminals. Priced from $1350.00 (Basic Unit).

SUPER 89 BIOS

The Super 89 BIOS is a greatly expanded operating system interface fully compatible with that provided with H/Z CP/M for use with the Super 89 and Heartbeat. Support is provided for all H/Z disk drive systems as well as Magnolia Microsystems 8"/5" disk controller, CDR systems FDC-880H, and hard disk systems using the popular XEBEC Winchester controller.

Expanded facilities of the BIOS include a built-in RAM Disk with capacity up to 170 Kbytes; a 48 Kbyte RAM print spooler; transparent operation at CPU clock rates of 2 or 4 MHz; increased TPA (Transient Program Area) for larger user programs; detailed error messages and user selection of recovery options; real-time clock support; simplified, self-prompting, configuration utility that is truly user-friendly; also, included are several useful utilities for expanded system operation.

The Super 89 BIOS is available separately, $60.

CP/M®, MP/M and MP/M II® are registered trademarks of Digital Research of Pacific Grove, California.
H88/89®, Z89/90®, H17®, H77®, H/Z 47®, Z67® and H-88-1® are registered trademarks of the Heath Company and Zenith Data Systems.
Z80® and Z80A® are the registered trademarks of Zilog Corporation.

D·G ELECTRONIC DEVELOPMENTS CO.

Ordering Information: Products listed available from DG Electronic Developments Co., 700 South Armstrong, Denison, Tx 75020. Check, Money Order, VISA or MasterCard accepted. Phone orders call (214) 465-7805. Freight prepaid. Allow 3 weeks for personal checks to clear. Texas residents add 5%. Foreign orders add 30%. Prices subject to change without notice.

Circle #114 on Reader Service Card

Communing by Computer

When the sun goes down, so does the price.

Frederick Zimmerman

What do you do when you want to:
- get assistance with a hardware or software problem?
- buy or sell a piece of used computer equipment?
- learn about a technical issue?
- keep track of news in the Heath/Zenith community?

You already have several options: you can visit your local computer dealer, or join a local Heath Users' Group (HUG), or call on knowledgeable friends, or subscribe to computer periodicals. But there may be logistical and pyschological inconveniences to using these sources of information. There is a considerable time-lag involved in waiting for the next meeting of a local users' group or the next issue of a periodical. Or you may feel that you shouldn't impose too frequently on your dealer or on your friends. And perhaps it's too much of a trip to reach your computer dealer or your HUG.

Fortunately, there is another source of Heath/Zenith computer information which you can reach without even leaving your computer keyboard: the HUG Special Interest Group (SIG) on the CompuServe Information Service (CIS). The HUG SIG gives you access to a very deep information pool, comprised of 2,400 fellow Heath/Zenith users nationwide. And, because CompuServe is a telecommunications network for personal computer users, responses to a request for information can come within a matter of hours or days.

The HUG SIG

To be a member of the HUG SIG, you must be a member of the national Heath Users' Group. The yearly cost is $20. Since membership in the national HUG includes some other valuable benefits, this is not a particularly onerous requirement. Members receive a year's worth of HUG's official publication, *REMark*. And, thanks to the parent Heath company, national HUG members also receive a 10% to 20% discount on Heath/Zenith computer products.

The HUG SIG is just one of many Special Interest Groups on the CompuServe network. The SIGs provide two major services to the specialized audiences within CompuServe's subscriber pool. First, they provide electronic "bulletin boards" where subscribers with mutual interests may share information by leaving messages to each other. Second, they provide "locations" where subscribers may store program or data files so that others may download the files from CompuServe to their own personal computers.

Because all the Special Interest Groups use CompuServe's standard SIG software, these functions work the same way for each SIG. Once you know how to use *one* SIG, you know how to use *any* SIG. This makes it easy for you to browse among the SIGs, looking for interesting or entertaining information according to your interests.

When you're paying $6 per connect hour (the standard rate) to read a SIG message base, it's annoying when there's too much froth and too little substantive content.

Each of the SIGs on CompuServe is devoted to a particular subject. There are Space, Entertainment, Golf, National Issues, Music, Legal, and Veterinarians' SIGs, to name just a few. And there are SIGs devoted to each major brand of personal computer, such as Heath/Zenith.

Of course, some SIGs are more useful and entertaining than others. The value of any CompuServe SIG to its members is determined by two primary factors: the quality of the SIG message base—the "bulletin board"—and the quality of the SIG public-domain data base of program and data files.

The quality of the message base is probably more important to more SIG members than is the quality of the data base. The messages provide instant communication of important information among SIG members. And checking the SIG message base regularly can provide the SIG member with the feeling of belonging to a community built on shared interests.

However, the data base does contain some types of public-domain programs which may be very useful to some SIG members.

The SIG data base

There are various utilities, communications programs, and games in the SIG data base. Many of the programs are written in assembly language for which the source code is available; so they are good examples from which to learn programming. And there are many SIG members who are knowledgeable about the public-domain programs. So if you run into a problem in adapting a program to your needs, there's a good chance you'll be able to find help on the HUG SIG.

The HUG bulletin board

The messages on the HUG bulletin board are usually intelligent and interesting. This is a sharp contrast to the message bases on some other CompuServe SIGs, where the "lightweights" seem to predominate. Sometimes they can clog up a bulletin board with one-sentence messages and trivial chit-chat.

To be fair, there's nothing wrong with using the bulletin board as a social medium. Later on, I will discuss the social functions of the HUG bulletin board. But when you're paying $6 per connect hour (the standard rate) to read a SIG message base, it's annoying when there's too much froth and too little substantive content. (For further information on CompuServe's rates, see the accompanying comments titled "An Introduction to CompuServe." Fortunately for Heath/Zenith users, the HUG bulletin board is short on froth and long on content.

The high quality of the HUG SIG message base may reflect the fact that many Heath/Zenith users are computer and electronics enthusiasts with a strong technical inclination. There are some real "wizards" on the HUG bulletin board, and they are frequently glad to share their knowledge. This friendly attitude, in turn, encourages less experienced users to seek assistance with technical problems. Consequently, many of the messages on the HUG SIG are about practical issues regarding Heath/Zenith hardware and software. Such messages, which are usually posted for public access, are likely to be helpful to other HUG SIG members who are facing similar practical problems with

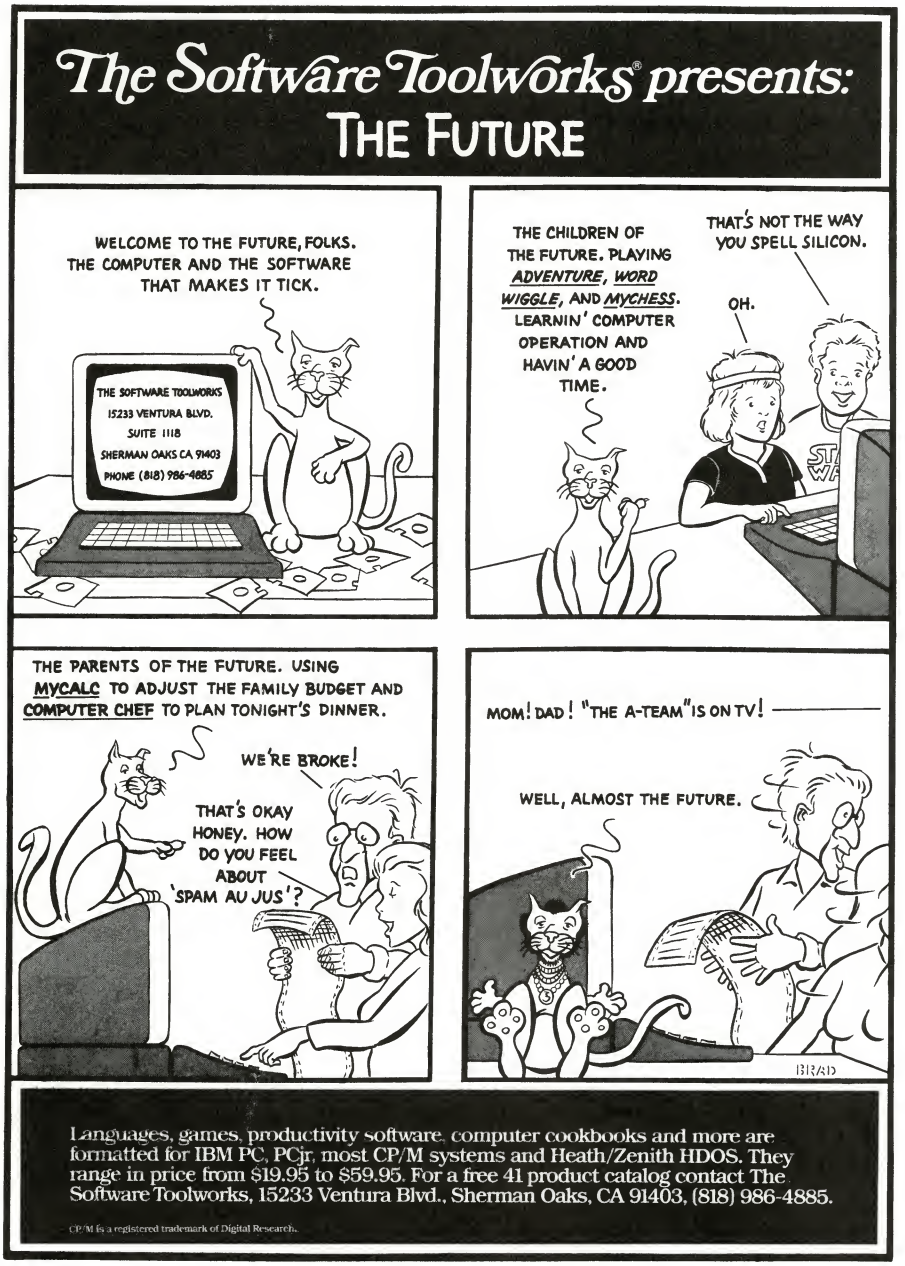
their Heath/Zenith systems.

The HUG bulletin board is divided into 10 sections: General Interest; Requests for Assistance; Telecommunications; HDOS; CP/M; CP/M-86; Z-DOS; Hardware; HERO I/Robotics; and Vendors/For Sale. When you leave a message on the HUG SIG, you are required to put it in one of these 10 sections. Thus, SIG members who are only interested in reading messages about the Z100 can set a switch so that CompuServe will only send them the messages posted in the Z-DOS section.

However, the messages do not always fall neatly within these subject-matter categories. And, in any event, there are many different types of messages within each section. So I'll categorize the messages by function rather than subject matter: help with using the CompuServe system; requests for assistance with hardware or software problems; information about technical issues; "for sale"; and news items and social messages.

Help with CompuServe

HUG SIG members frequently seek technical advice on how to use CompuServe. Unfortunately, CompuServe's documentation leaves a lot to be desired, so these cries for help are not uncommon. Beginners are encouraged to ask for help when they need it. Knowledgeable HUG SIG members are willing to help beginners learn how to use the system. The SYStem OPerators, in particular, can be very helpful—that's what they're there for. The HUG SYSOPs are charged with seeing that the SIG runs smoothly. Several people share the SYSOP duties, including Terry Jensen of the Heath Users' Group, and volunteers Bill Parrott and Dwight Ernest.


The Software Toolworks® presents:
THE FUTURE
WELCOME TO THE FUTURE, FOLKS. THE COMPUTER AND THE SOFTWARE THAT MAKES IT TICK.
THE SOFTWARE TOOLWORKS
15233 VENTURA BLVD.
SUITE 1118
SHERMAN OAKS CA 91403
PHONE (818) 986-4885
THE CHILDREN OF THE FUTURE. PLAYING ADVENTURE, WORD WIGGLE, AND MYCHESS. LEARNIN' COMPUTER OPERATION AND HAVIN' A GOOD TIME.
THAT'S NOT THE WAY YOU SPELL SILICON.
OH.
THE PARENTS OF THE FUTURE. USING MYCALC TO ADJUST THE FAMILY BUDGET AND COMPUTER CHEF TO PLAN TONIGHT'S DINNER.
WE'RE BROKE!
THAT'S OKAY HONEY. HOW DO YOU FEEL ABOUT 'SPAM AU JUS'?
MOM! DAD! "THE A-TEAM" IS ON TV!
WELL, ALMOST THE FUTURE.
BRAD
Languages, games, productivity software, computer cookbooks and more are formatted for IBM PC, PCjr, most CP/M systems and Heath/Zenith HDOS. They range in price from $19.95 to $59.95. For a free 41 product catalog contact The Software Toolworks, 15233 Ventura Blvd., Sherman Oaks, CA 91403, (818) 986-4885.
CP/M is a registered trademark of Digital Research.
Circle #248 on Reader Service Card

Sometimes, more advanced users also call for technical advice. It seems that the most frequently encountered problems have to do with downloading and uploading files from and to CompuServe. Public-domain programs are available to perform these tasks, but sometimes it takes tinkering to get them to perform properly with a particular system configuration. Since these programs are in the public domain, there are often several HUG SIG members who are intimately familiar with their inner workings. These experts are often able to suggest ways to modify the programs.

Requests for assistance

The more active members of the HUG SIG have had very wide experience with hardware and software for Heath/Zenith computer systems. Many software developers use the SIG, including some people who have written very popular programs for Heath/Zenith computers: Dale Wilson (Palette), Dale Lamm (ZLYNK/II), David Wadsworth (Reactor100), Mike Cogswell (UDUMP), and SYSOP Bill Parrott (HDOS enhancements). So the HUG bulletin board is an excellent place to ask for technical advice.

Many HUG SIG members need technical advice on interfacing problems—how to hook up two or more hardware or software products, not necessarily intended to be compatible, so that they will work together as part of a complete computer system. If you leave a message on the bulletin board, explaining your problem and describing your system, you'll probably find out whether there is a solution to your problem. And if there isn't, someone will tell you why not. Exchanges of this sort are usually posted for public access—after all, why would anyone want to keep them a secret? If you monitor problem-solving exchanges, you can often learn how to avoid encountering the same problems yourself.

Information about technical issues

The HUG bulletin board is also a good place to look for information on technical issues.

For example, you may have heard that there are several versions of the read-only memory (ROM) used in the Z100 series computers. The version numbers range from 1.1 to 2.5, and—most unfortunately—some programs do not work with certain ROMs. For example, programs compiled using the Z-BASIC Compiler will not work with ROM version 1.1.

If you had wanted to know more about the Z100 ROMs, you would have been interested in some comments made by Dale Wilson (author of Palette) on the HUG bulletin board in late October (message #66604). "One of the

things delaying David Wadsworth's fantastic reactor program [Reactor100] is the fact that he is having trouble getting it to run with both 1.2 and 2.5 ROMs at the same time! Maybe we will end up having to release multiple versions (with updates every time Zenith flakes out a new ROM!) Z-BASIC vs. the multitude of ROMs may be the dumbest thing Zenith has done in quite a while!"

To be sure, seeing Dale's message wouldn't have answered all your questions—but it would have given you a starting point, and, most important, someone to whom you could send a message with further questions. One of the most important benefits of the HUG bulletin board is that it gives you a place to ask questions, and a "panel" of experts to ask them of.

For sale

The Vendors/For Sale section of the HUG bulletin board is an excellent place to put "for sale" ads, since the audience is preselected. That is, it's already composed of people who are likely to have an unusually high degree of interest in your brand of computer equipment. Furthermore, the response time to an ad can be very, very fast. Some dealers use the HUG SIG to announce new products, special promotions, and sales. Tom Jorgenson of Software Wizardry and Ray Massa of Studio Computers are especially active in this regard.

In February, Tom used the HUG SIG's conference facility to conduct an "electronic auction." The conference facility allows two or more SIG members to converse on-line. After you type a message, about three seconds later it will reach the other participants in the conference. (For further information, see the accompanying comments, reprinted from issue #85 of *Buss: The Independent Newsletter of Heath Co. Computers.*)

There are two obvious disadvantages to buying and selling over CompuServe: first, the fact that you may be dealing with someone you've never met face-to-face; second, shipping costs. However, these disadvantages (which are not unique to CompuServe) may be outweighed by two considerations.

First, the mere fact of being a member of the HUG SIG makes the other party something of a "known quantity." Second, in exchange for shipping costs you are gaining access to a nation-wide market, as opposed to the limited local market you can reach via local users' groups and so forth. The larger national market is more likely to have buyers who are interested in the particular hardware or software you want to sell, and more likely to have sellers who have the particular item which you are interested in buying. So the HUG bulletin board is an especially good place to go if you are buying or selling anything unusual.

News messages, etc.

HUG bulletin board messages are an excellent medium for transmitting news about the Heath/Zenith community. The audience is receptive to news about Heath/Zenith computers (more so, perhaps, than the typical CompuServe user's family and friends). And the HUG bulletin board offers extremely fast turnaround times on information. As soon as a message can be posted, it can be read. Moreover, for most HUG SIG members CompuServe obliterates geographical obstacles to the transmission of news, since for most members the HUG bulletin board's Heath/Zenith information is within reach of a local

Electronic Auction Bargains

On February 18, Tom Jorgenson of Software Wizardry held an "electronic auction" using the CONference facility in CompuServe's HUG bulletin board. (He was unloading some inventory prior to moving to a new facility.) Heath users from all over the country submitted bids via computer. The auction was held at 6:00 p.m., two hours before the regularly scheduled HUG BB CONference. At the peak of the auction, there were as many as 17 people participating.

The HUG BB audience made auctioneer Jorgenson work for his money. Frequently there was only one bidder for a particular item. For example, a prominent member of the Capital Heath Users' Group (CHUG) was the only bidder on a copy of Lotus 1-2-3. He made the minimum bid, which was about 10% less than the lowest price normally available from mail-order discounters, and went away with a super bargain. (Tom Jorgenson remarked, "I'm going to lose some sleep over this one!") *Sextant* was the only bidder on a copy of dBASE II for the IBM PC, and we also paid substantially less than the lowest price normally available. We hope to run this software on our eagerly awaited Z150.

There was competition for a few of the items, such as an 8" dealer demonstration disk of CP/M games, and a copy of Magic Wand for CP/M. But there were only a handful of items for which more than two people bid, and this helped keep the final prices low.

Some of the products offered for sale were rather strange. For example, Tom tried to sell a set of 15 cassette programs from the national Heath Users' Group. But nobody on the HUG BB would admit to still having a cassette system.

After the auction, Tom asked for comments from the audience. The consensus seemed to be that the "electronic auction" was an interesting experiment, worth doing again (for the purchasers, anyway).

—Frederick Zimmerman

The above article is reprinted from the February 22, 1984, issue of Buss: The Independent Newsletter of Heath Co. Computers.

NEW Z-DOS WORDKEY™ SIMPLIFIES WORDSTAR™

Introducing WordKey. WordKey replaces **ALL** of WordStar's control-key commands with much simpler and faster keypad and function-key commands. Each function and keypad of your H/Z-100 is used two or three times over to define more than 90 key combinations. You'll never need to hold down the control key again! Look at these features:

- Keys are logically grouped so that the most often-used commands are single keystrokes. Move around the screen quickly and easily. Lesser used commands are two separate keystrokes that can be entered with one hand.
- Full onscreen help is always instantly available, including two different key diagrams and a separate explanation of each key's function. Just press the HELP key.
- Blank ruler line... Block cursor and key-click on/off...Detailed User's Manual and printed keyboard diagrams...And much more.
- Use with either WordStar version 3.21 or 3.30.

Please send me:
Z-DOS WordKey: _____ copies @ $49.95 $ _____
Special: C.Itoh Prowriter graphics screen dump program _____copies @ $19.95 $ _____
Calif. residents please add 6% tax $ _____
Total Enclosed (includes mailing) $ _____

Name _____
Address _____
_____

DelSoft
Gary Deley, 564 Calle Anzuelo, Santa Barbara, CA 93111
(805) 967-9566 eves and weekends

Circle #102 on Reader Service Card

phone call.

In the evening of October 23, 1983, within hours after the conclusion of the Capital Heath Users' Group Conference (CHUGCON), CHUG member Larry Ruh sent a message to all members of the HUG SIG. The following is an excerpt from that message; it serves as a good example of the way in which the HUG bulletin board is used to communicate news of interest to the Heath/Zenith community.

"You know that little red and white HUG membership card you've got? Well it just became worth something other than the space it takes up.

"Effective 1983 December 1, all HUG members of 90 days tenure or longer will be entitled to a discount on up to $5,000 worth of H/Z computer-related items purchased at an HEC or by mail from Heath Catalog of 10% on kits and 20% on pre-wired items. A full detailed announcement will be forthcoming soon in REMark. A new membership card is being designed for easy recording of purchases, but the current card will be used until next anniversary date of your membership.

"I'm sure we'll get clarifications of questions asked at CHUGCON and other items almost immediately.

"Quite a benefit for a minimal investment, Hmmmmmm?

"Thanks to HUG, Heath, and Veritech. [Veritechnology is the company which runs the Heathkit Electronic Centers.]

"—Larry.

"P.S. —That translates to an H100 for $1,700 and a ZW-120-32 for about $4,600!"

By 3:00 a.m. Eastern Time that night, another CHUG member, Mike Cogswell, had added a message expanding on Larry's information.

"What he neglected to mention is this: the discount is in addition to any other discount! If you buy something with a 10% coupon, the HUG discount is on top of the previous 10%!"

Sometimes the news is of a more speculative nature: rumors about new products from Zenith Data Systems or independent suppliers. In early February, for example, there was a flurry of speculation on the HUG SIG, just before Zenith announced its new Z150 and Z160 IBM-compatible computers. Some HUG SIG members are quite knowledgeable about the inner workings of Zenith Data Systems and the Heath Company, so the HUG SIG is a good place to look for information.

Z-100

CP/M-86

$99.97

Yes, you can have CP/M-86 on your Z-100 for 60% less than Zenith's $250 price.

For additional information, please contact:

Barry A. Watzman
560 Sunset Rd.
Benton Harbor, MI
49022

616/925-3136

Z-100 is a registered trademark of Zenith Data Systems, Inc.
CP/M-86 is a trademark of Digital Research, Inc.

Circle #206 on Reader Service Card

An Introduction to CompuServe

Anyone with a computer or terminal, a modem, a telephone, and an account with CompuServe (once known as MicroNET) can make a phone call to any CompuServe "node" and gain access to CompuServe's mainframe computers in Columbus, Ohio. The "nodes" are smaller computers (still part of the CompuServe system) located in more than 150 cities. Additionally, CompuServe subscribers may access CompuServe via the Telenet, Tymnet, and DataPac networks (although there are hourly surcharges).

Once you have gained access to CompuServe, your computer acts as a remote terminal. So when you type a command on your keyboard, it will be transmitted to CompuServe's mainframes, which will then send information back to your screen.

How you join CompuServe

You can get an account with CompuServe by buying a CompuServe starter kit for $20. They're available from many computer retailers, including Heathkit Electronic Centers and Radio Shack. If you call CompuServe for information at 800/848-8199, they'll direct you to your nearest dealer.

The starter kit equips you with a temporary CompuServe password and one free hour of access to CompuServe. You incur no obligation by purchasing the starter kit. You "log on," use your free hour of access, and then decide whether you want to be a permanent subscriber. You may use up your hour all at once, or you may break it into several shorter sessions. Each time you log on, you are given an opportunity to tell CompuServe that you want to be a permanent subscriber. (More about "logging on" below.)

When you enter the billing information, you should be sure to have ready your VISA or MasterCard number, or else your checking account number. That's because CompuServe does not bill its subscribers in the normal fashion. There is no "bill me" option. Either they will charge your monthly fee against your credit card, or they will make a monthly withdrawal from your checking account.

Yes, *they* take the money out of *your* account. Fortunately, they are obliged to give you at least 10 days notice of the amount they intend to withdraw. If you do not have a checking account or major credit card, you cannot register as a permanent subscriber. When you register, you receive a bonus: two more free hours of CompuServe service (although some areas of the system will be off-limits to you until you receive your new password as a permanent subscriber).

Once you have registered as a permanent subscriber, CompuServe will send you a printout of the billing information you have entered. If you chose the automatic withdrawal option, you must sign and return a statement authorizing them to make withdrawals from your bank account. As soon as they receive that statement, they will send you a new password. Once you receive a new password, you have full access to the system, and you will be charged according to CompuServe's normal rates.

If you are using a 300-baud modem, CompuServe charges $6.25 for each hour you are connected to the CompuServe system during Standard Service hours—6:00 p.m. to 5:00 a.m. weekdays, all day Saturdays and Sundays, and "announced CompuServe holidays." During Prime Service hours—8:00 a.m. to 6:00 p.m. weekdays—CompuServe charges $12.75 per hour. If you are using a 1200-baud modem, CompuServe charges $12.75 per "connect hour" for Standard Service, and $15.25 per connect hour for Prime Service. HUG members receive a discount of 50¢ per hour while using the HUG SIG.

And sometimes the HUG SIG is used to broadcast new product announcements.

For example, in late October Software Wizardry's Tom Jorgenson used the SIG to announce that a demo version of Wizardry's simulation program Reactor100 had been placed in Section 6 of the XA data base. So HUG SIG members learned before anyone else that Reactor100 was going to be available, and they even had an opportunity to try out the demo program before the actual program was released.

Dale Wilson also used the HUG SIG to announce a new product release.

#: 67159 Sec. 0—General Interest
Sb: #New release
05-Nov-83 07:11:48
Fm: Dale Wilson 72135,1402
To: All

After several months of intensive development work, my wife and I are pleased to announce a new release of OFFSPRING is available. This release is Version 2. There are several differences between this release and the previous one. To provide continued support for those who have grown fond of the previous release, both versions will continue to be supported for many (many) years.

Features of the new release include:
Name: Michael Andrew Broderson Wilson
(It's a Boy (again))
Release date: November 3, 1983 (2:02 a.m. (yawn))
Weight: 5 lb. 15 oz.
Condition: excellent, although cosmetic changes may be required in the near future.
Tina and I would like to thank everyone who has provided support and interest in this project.

Conclusion

We've seen that the HUG SIG can provide you with valuable technical information about your Heath/Zenith computer system. I hope Dale Wilson's message (above) has also shown you that the HUG SIG can be fun. Check it out.

HUG Membership Information

Initial year's membership: $20 U.S. and domestic; $22 Canada and Mexico; $30 international.
Heath Users' Group
Hilltop Road
St. Joseph, MI 49085
616/982-3463

What modem speed?

In theory, a 1200-baud modem transmits and receives information four times as fast as a 300-baud modem, so at 1200 baud you are paying half as much per unit of information. In practice, a substantial fraction of your connect time consists of the time *you* spend in deciding what to do next, and then in typing in the appropriate commands. You don't *think* any faster using a 1200-baud modem than you do using a 300-baud modem, so the "interactive" fraction of your connect time is a constant. Thus the cost advantage is not as great as the raw numbers would suggest, unless you are performing a non-interactive procedure like downloading a data file from CompuServe to your own computer.

However, there is an important performance advantage to a 1200-baud modem. At 300 baud, information c-r-a-w-l-s a-c-r-o-s-s t-h-e s-c-r-e-e-n v-e-r-y s-l-o-w-l-y. This can be maddening, particularly when you are trying to read through a long text file or series of messages. At 1200 baud, you don't have to spend as much of your own time waiting for the computer. The only catch is that 1200-baud modems usually cost $600 or up, whereas 300-baud modems cost from $100 to $300. If you can afford it, you'll appreciate the added convenience.

Logging on

"Logging on" sounds like "computerese", but in fact it's a straightforward procedure. You connect your computer to the modem and connect your modem to the phone, then dial CompuServe's local phone number. (With some modems, you can use your computer's communications software to instruct the modem to make the call.) Your computer will tell you when it has established a connection between itself and CompuServe. The connection is used for transmitting information.

The first information you send CompuServe is that you want to use the CompuServe Information Service (CIS). To tell CompuServe that, all you need to do is type CTRL-C right after you've established a connection. CompuServe will then ask you for your ID number. After you enter the ID number, CompuServe will ask you for your secret password.

After CompuServe receives your (valid) password, you're in business. CompuServe will send you a list of several options, followed by an exclamation point (!). At the exclamation point, you may do one of three things: you may choose one of the menu options, you may give CompuServe a direct command (such as GO PCS-48, which would take you to the HUG SIG), or you may type H for HELP.

What CompuServe can do for you

The CompuServe Information Service provides a variety of on-line services, some of general interest, others for more specialized audiences. Using CIS, you can have access to: programming languages running on CompuServe's mainframes; word processing using CompuServe's RUNF10 program; dozens of computer games; CB, a simulation of Citizens' Band radio (messages are typed rather than spoken); the flight schedules for all commercial airlines operating throughout the world; the Value Line Database II, with financial information on more than 1,600 companies; the latest stock quotes, brought to you by CompuServe's Quick Quote system; shopping services; an on-line encyclopedia; and much more. (There are additional charges for some of these services.) I looked for bibliographic and scientific data bases, but didn't see any; which isn't to say that they aren't there.

Let me emphasize again that CompuServe is a *big* system. A detailed description of all the general-interest facilities is beyond the scope of this article; suffice it to say that they are well worth investigating.

FOR KIDS AGES 2–6
EDUCATIONAL SOFTWARE

LETTERS AND NUMBERS **$29.95**
8 moving graphics programs which introduce letters, numbers and the computer.

PRESCHOOL CHALLENGE **$29.95**
9 moving graphics programs which introduce counting and decision making.

MOTHER GOOSE **$29.95**
11 moving graphics Nursery Rhymes which introduce word association and early reading.

ALIEN FACES **$29.95**
A pure fun program for kids of all ages, generates over a million "solid looking faces" by pressing numbers on the keypad.

For HDOS, CP/M, CP/M-85, MBASIC and 48K memory, on hard or soft sectored 5¼" distribution disks. Please specify format and hard or soft sector when ordering. The CP/M-85 versions for the Z100 are in color. Write or call (313) 651–3859 for details on each program package.

INTUITIVE LOGIC
412 Taylor Street
Rochester, Michigan
48063–4327

Circle #177 on Reader Service Card

Special

Your choice: Three ribbons: Epson MX/FX refill or NEC-8023/ C. Itoh 8510 refill: 3 for $10 postpaid.

Printers

Gemini Printer. 120 cps, Epson - compatible codes. Incl. download char set capability, ultra-hi-res graphics, parallel interface.
GEMINI 10X: $299 postpaid.
GEMINI 15X: $475 postpaid.

Radix Printer. 200/240 cps print, 16K buffer, single-sheet feeder, near letter quality print, both serial and parallel interface, short form tear-off, and more!
RADIX 10: $720 postpaid.
RADIX 15: $840 postpaid.

Diskettes

Single sided, double density diskettes with hub rings and labels. Specify either Hard or Soft Sector. $17.00 ppd.

Modems

Anchor Signalman Mark XII modem: Auto-dial, auto-answer, 300/1200 baud direct connect. Hayes software & Bell-103/212 compatible. With power supply. $338 ppd.

Ribbons

EPSON 80 refill:$3.50;cart:$7.50
EPSON MX/FX-100 cartridge: $9.00
NEC-8023 / C. Itoh 8510 refill: $3.50; cartridge: 6.00
Gemini/Microline spool: $3.00

Software drivers 1/2 price with printers. Payment via check or money order. (Please certify checks over $200). All checks must be drawn in U.S.funds on a U.S. bank.

LINDLEY SYSTEMS
21 Hancock St.
Bedford, MA 01730
Phone (617) 275-6821 6-10 PM

Circle #131 on Reader Service Card

SMART MACHINES™

SofTouch™: A key remapping utility for the Z-100 that redefines any keyboard keys to your specifications for any application program, assigning labels for the remapped keys on the 25th line. **Fast**—does not require a slow co-resident program. Price includes Z/STAR. $39/$3 manual only (3,4)

SLEDGE™: The mean general ledger that does it the way a computer does it best. Includes format-controlled charts of accounts, customized statements, budget comparisons, help screens, and much, much more. $100/$15 demo and manual (1,2,3,4)

FLIGHT SIMULATOR: Fly a 747/Cessna/glider anywhere. Many features and settable conditions. Requires 64K. $29/$3 manual only (1,2,3)

GRAPH-IT: Plot up to 50 functions on any line printer. Create data files with SuperCalc, dBASE II, BASIC, WordStar, and other programs. Many options, thorough manual. $29/$3 manual only (1,2,3)

Z/STAR: Defines and labels all special function and keypad keys for Z-100 users of WordStar (any version). Installation requires only copying files to WordStar disk, results in a **logical** extension of WordStar commands. $24/$2 manual only (3,4)

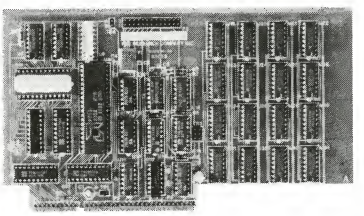
Z/BASE: like Z-STAR, but for dBASE II. $24/$2 manual only (3,4)
EP/STAR: configures WordStar thru v.3.2 for Epson printers $19/$2 manual only (1, 2)
89/STAR: like Z-STAR, but for the H-89 and WordStar thru V.3.0. $29/$2 manual only (1,2)

*Add $2 per order for postage and handling
*Disk formats available indicated in parentheses
(1) HS-89-80 for H89 & CP/M-80
(2) SS-89-80 for H89 & CP/M-80
(3) SS-100-85 for Z100 & CP/M-85
(4) DS-100-ZD for Z100 & Z-DOS

INTERACTION DYNAMICS SYSTEMS™
KAPAAU, KOHALA, HAWAII 96755-0419

Circle #135 on Reader Service Card

FBE Cards For Heath/Zenith '89 Computers



SPOOLDISK™ 89 Electronic Disk and Printer Interface/Spooler. Microprocessor-based card with 128K RAM acts like fast, quiet disk and runs printer via Centronics Parallel interface (RS-232 Serial available). Use for normal system printing or spooled automatic printing with multicopy, multifile capability. I/O via unused serial ports 327Q and 337Q. Installs on right side bus (No Room? See FBE SLOT 4!). CP/M and HDOS software included.
SPOOLDISK™ 89 $395 Printer Cable $24

SLOT 4 Bus Extender Adds fourth slot to right side bus. Easy installation with no permanent modifications. Uses existing accessory mounting bracket to hold cards in place. Provision for swapping slot I/O with switch or by software.
SLOT 4 $47.50

H89PIP Parallel Interface Port Two ports using 8255 PPI chip. Each port has 8 data bits and 3 control bits. One port is buffered for use as Centronics Parallel printer port. The other is bare for use as input or output. Installs on right or left side bus. Printer driver software included.
H89PIP $50 Printer Cable $24

FBE Research Company, Inc.
P.O. Box 68234 Seattle, WA 98168
206-246-9815 (Evenings)
FBE
VISA and MasterCard Accepted • CP/M is a Trademark of Digital Research Inc.

Circle #116 on Reader Service Card

1-2-3 for the '110/120

Lotus 1-2-3 combines a spreadsheet with graphics and a data base. The version for the Z110/120 takes advantage of its superior graphics.

Wayne Rash, Jr.

Every so often, a computer program comes along that so captures people's fancy that they buy a computer just to run the program. A classic example of this was VisiCalc, which was probably instrumental in assuring the success of the Apple computer. Lotus Development Corporation may repeat the phenomenon with its product, 1-2-3. Zenith would certainly be at a disadvantage if the H/Z110/120 and Z150/160 were *not* able to run Lotus 1-2-3. And the Z110/120 displays 1-2-3's graphs with higher resolution than most of the other computers that run the program.

Lotus 1-2-3 was the first of the new wave of "integrated" business software packages. This means that the program combines more than one function into a single system. In the case of Lotus 1-2-3, the program combines an electronic spreadsheet, graphics, and a limited but very useful data base capability. Some of the spreadsheet packages on the market now also have graphics capabilities. (See the remarks accompanying this article, "Alternatives to 1-2-3.") The combination, in one package, of spreadsheet and data base functions, however, is unique to Lotus 1-2-3 and its followers.

The data management functions of 1-2-3 are incorporated into the spreadsheet. The result is a spreadsheet format with sorting capabilities. Mathematical calculations can be performed on any of the fields, and any numerical field can be output to the graphing section of Lotus 1-2-3. (Some examples of uses for Lotus 1-2-3 are given in the accompanying comments, "Lotus 1-2-3 at *Sextant.*")

Since Lotus introduced its product, other companies have followed suit and have produced products that perform in a similar manner. In some cases, these late arrivals show improvements over Lotus 1-2-3. In spite of the improvements shown by its competitors, though, Lotus 1-2-3 continues to be a very popular product among business users.

Electronic spreadsheets have long been popular in business. If a product based on a spreadsheet expects to be well received, then it must compete favorably with the other spreadsheets in the market. The graphic displays and the data management are nice to have, but the power of 1-2-3 is based on its spreadsheet. The reasons for the popularity of Lotus 1-2-3 become obvious when you use the product.

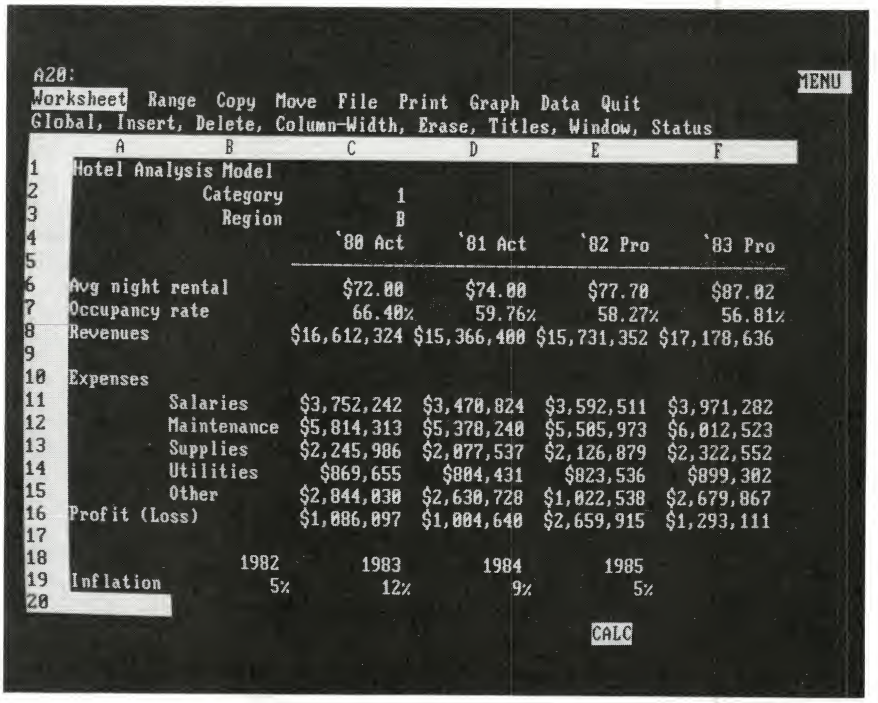


Photo courtesy of Lotus Development Corporation

The first line of 1-2-3's menu gives the basic categories of commands. (The worksheet has been selected here.) The second line gives subcommands within the category selected.

Getting started

You will find it a lot harder to get started using Lotus 1-2-3 than you might expect. Lotus 1-2-3 is sold in a version unique to each MS-DOS machine. (On the Z110/120 it runs under the Zenith Disk Operating System—Z-DOS.) Therefore it lacks an installation program such as is included with many a CP/M program to customize it for the particular computer on which it will be used.

However, you must run a batch file, provided with 1-2-3, to tell Lotus 1-2-3 what type of monitor and printer you are using. The batch file installs drivers on each of the Lotus 1-2-3 disks. These drivers actually are the vehicles Lotus 1-2-3 uses to send information to peripheral equipment attached to your computer. (Users of the Heath Disk Operating System will find this concept familiar.) Since Lotus 1-2-3 comes on several disks, you must install drivers on each of these in turn.

Even after you have done this, you still have to do some additional configuration within Lotus 1-2-3, and to copy some files from Z-DOS disk 1 to the Lotus utility disk. These files allow you to perform some backup and maintenance functions from within Lotus 1-2-3.

You are going to have to swap disks a lot as you use the program. The graph-printing and utility functions are on separate disks, and if you want to perform any of these functions, you must insert the proper disk. This can be a major irritation in an otherwise excellent program. It can be avoided if your system includes a hard disk or an 8" floppy to which you can transfer all the files.

Getting started with Lotus 1-2-3 can be a very time-consuming process.

Learning the system

Most complex, capable systems are hard to learn. You will probably feel intimidated by the thick, gray Zenith Data Systems manual. When you see that the package contains several disks, you will feel even more intimidated. You may have visions of sitting in front of your '100, drowning in a sea of disks. The complex installation process probably does a lot to reinforce that impression. In spite of the appearances, though, Lotus 1-2-3 is not really all that hard to learn.

A great amount of credit for the ease of learning Lotus 1-2-3 goes to the excellent Lotus tutorial. Without this disk-based training, Lotus 1-2-3 would be very difficult to learn. The tutorial combines disk-based learning with actual practice using Lotus 1-2-3. The result is an interactive instructional session, where the instructions appear on the screen, and you actually perform the actions as required. The Lotus 1-2-3 tutorial may be one of the best available in the industry.

In order to be comprehensive, the tutorial is necessarily long. You are presented with a menu of the various sections of the tutorial, starting with an introduction to the system and ending with a discussion of the graphics capabilities of the program. This allows you to break the tutorial up into manageable sessions. It also allows you to start using Lotus 1-2-3 after only a few minutes of training.

As good as it is, the Lotus 1-2-3 tutorial only gives you the beginnings of using Lotus 1-2-3. This is a very complex system, and a great deal of practice is required to learn it really well. The data-management portion of the system, for example, is barely mentioned in the tutorial.

Using Lotus 1-2-3

The first thing you notice about Lotus 1-2-3 when you start running it is ACCESS—a "shell" Lotus 1-2-3 places between you and Z-DOS. ACCESS presents itself as the main menu of the program, from which you may enter the various subdivisions of Lotus 1-2-3: File-Manager, Disk-Manager, PrintGraph, Translate, and 1-2-3 itself. In these sections, you can perform most of the common functions associated with backing up and formatting disks, as well as printing graphs and using the spreadsheet.

Once you have entered ACCESS, you will start using the Lotus 1-2-3 method of entering commands. You will find your possible choices listed on the screen, with one of the choices highlighted. You may type ENTER to choose that option, or you may type the first letter of another option and choose it instead. You may also move among the choices with the space bar or arrow keys. If your choice has a submenu, you are then shown this, and asked to respond as before. You are always asked to confirm your choice before you do anything permanent.

Most users will use Lotus 1-2-3 primarily as a spreadsheet. This is its primary purpose, and it performs this job very nicely. I should add that there may be better spreadsheets in existence, but Lotus 1-2-3 is certainly as good as most. You move about the spreadsheet easily, controlling the cursor position with the arrow keys. You are not distracted by the presence of a menu during normal operations.

Entering data and text is easy and creates no surprises. You may indicate the format that you wish assigned to each row or column. These formats can include the number of decimal places the entries should have, or specify that the numbers be expressed as dollars. You may also specify that fields contain text, or be a particular width. Most other functions usually expected in a modern spreadsheet program are present as well.

Lotus 1-2-3 will also perform data management for you. This useful feature is an extension of the spreadsheet, and should not be confused with more powerful data base management systems such as dBASE II or Condor 3. However, for many, Lotus 1-2-3's ability will be entirely adequate.

You may enter up to 2,048 records, provided you have enough memory. The records are all held in random access memory (RAM). This makes for speedy sorting, but you may not have enough RAM for extensive manipulation of a large number of records. (See below.) You may use the information from a 1-2-3 spreadsheet for input, or you may pass information to a spreadsheet.

Lotus 1-2-3 gives you the ability to sort the fields of the data file, and to

AMERICAN COMPUTER

12 Haddon Avenue, Westmont NJ 08108
(609) 854-3214

ZF-111-32 Low profile Z-100 with 11.3 MG. hard disk, one 320K disk drive, 192K RAM, 1 parallel, 2 serial ports, color graphics, and Z-DOS..... **$3945.00**
ZF-111-32 system with a letter quality printer **$4249.00**
Quantities limited on the ZF-111-32.

NEW 150PC PRICING

ZF-151-22 IBM-compatible Z-150PC, two 360K disk drives, 320K RAM, one parallel, 2 serial ports, detached keyboard, IBM expansion bus, and MS-DOS **$2195.00**
ZF-151-22 system with letter quality printer **$2495.00**
ZFA-161-22 Portable System, IBM-compatible, two disk drives, 320K RAM, one parallel, 2 serial ports, detached keyboard, 9" amber display, MS-DOS, IBM bus **$2345.00**

All Software for Zenith's NEW IBM-Comp. PC ..... **20% OFF**

Gemini 10X Printer, 120 C.P.S., graphics **$274.00**
Sweet-P Six Shooter Plotter, six pen, parallel and serial interface, compatible with HP 7470 and 7475 ..... **$845.00**

SANYO 555-2 COMPUTER SYSTEM

SANYO MS-DOS computer includes:

HARDWARE	SOFTWARE
128K RAM	Wordstar
two 360K disk drives	Spellstar
printer port	Mailmerge
detached keyboard	Datastar
	Calcstar
$1499.00	Graphics Basic
with free monochrome monitor	MS-DOS 2.11
(a $159.00 value)	EasyWriter 1

Minimum shipping & handling charge $3.00
Prices subject to change
Send for free catalog. Out of USA $2.00 for postage.

ZENITH data systems — Authorized Sales and Service Center
VISA and MASTERCARD add 3%

Circle #188 on Reader Service Card

HIGH QUALITY SUPPLIES

Hardware

FingerPrint (MX, RX)	$54.95
FingerPrint (FX)	$64.95
Microspooler (serial to serial)	
16K $239 32K $269 64K $319	
The Lemon-surge protect	$54.95
Volksmodem-direct connect	$74.50

Disks

5¼" Hard Sector (10)	$27.50
Soft Sector (10)	$29.75
DS/DD 96 TPI (10)	$44.50
Disk carousel (holds 70)	$21.00

Ribbons

H-14 (black-blue-purple)	3/$12.00
MX, FX, RX 80 (black)	2/$11.00
MX, FX 100 (black)	2/$17.00
IDS 460/560 (black)	2/$17.00

Programming Aids

Flowcharting Sheets	Graphic Plotter Sheets
Video Layout Sheets	Printer Plotter Overlay
Printer Layout Sheets	COBOL Programming Sheets

Paper Porter
$4.50 ea.

Please add $2.75 for shipping. NY residents please add sales tax.

Send for FREE catalogue
The PC&J Graphics Co., Inc.
PO Box 108, Deer Park, NY 11729
516/667-8076

Circle #146 on Reader Service Card

retrieve them as needed. You may also use the graphing function of Lotus 1-2-3 to display numerical data. This data-management ability is ideal for many small businesses to perform such tasks as keeping track of the sales staff's commissions, for example.

Ease of use

The people at Lotus Development Corporation have gone to a lot of trouble to make many tasks very easy for you. You can block off areas of the spreadsheet to be made into a graph, or sent to the printer. You just indicate a starting point and an ending point. The indications can be entered directly by telling the program the limits of the area that you are marking off. Or you can do it the easy way and simply move the cursor to point out the areas you want to mark off. You can use a similar operation to indicate blocks to be used for calculations.

Entering commands is equally easy. You type a slash (/) and the menu is presented to you. You can make your selection by moving the cursor with the arrow keys. Or you can type in the first letter of your choice, and the item will be executed. Adding to the convenience is a reminder message that is displayed as each choice is highlighted. Too brief to be considered a help file, these reminders serve to jog your memory as to the function of the command.

Those whose memories need more than just a simple jog will find relief in full-fledged help files that cover nearly every subject imaginable. These help files are very complete, and in many cases lead to more in-depth help files that can be read if desired.

Graphics

It is the ability to display your data in a graph that makes Lotus 1-2-3 stand out among its competitors. There are few things that can summarize the mass of data in a filled spreadsheet as well as a chart or a graph. Before Lotus 1-2-3 appeared, you could do this only by running a separate program or hiring a graphics artist. Most people would choose to do without or do the job poorly when faced with these alternatives. Lotus 1-2-3 changed all this, and suddenly made high-quality graphics available to nearly anyone.

Using Lotus 1-2-3 to display a graph on the screen of your Z100 is easily accomplished. You use the "View" function to tell Lotus 1-2-3 where to find the information you want to graph, and what sort of display you want. You also have the option of using field headings as the labels on the graph; or you may enter your own labels.

Once you have told Lotus 1-2-3 how you want the graph to look, you press the F10 key and your graph is displayed on the screen. If you have a color monitor, you get a color graph; for monochrome users, there is a version which fills the different areas of the graph

Lotus 1-2-3 at Sextant

At Sextant, we use Lotus 1-2-3 both for data management and for its spreadsheet capabilities.

For simple data base operations, Lotus 1-2-3 is more useful than dBASE II and other powerful data base programs. 1-2-3's spreadsheet format enables you to see one page of information at a time; that is, 20 records. (Most data base packages will only show the current record as it is created.) In putting together the Index to *Sextant*, in this issue, we found it helpful to get an overview, on the screen, of the articles and their categories.

In terms of the spreadsheet, we find Lotus useful mostly as a calculator. An example of this is when we set advertising rates for *Sextant*. Lotus makes it easy for us to make sure the proportions of price to ad size are always consistent.

Some sample files

Some of our uses for 1-2-3 are represented in Table 1. This chart illustrates how 1-2-3 uses different amounts of memory for different files. The descriptions below should give you an idea of the jobs we do with 1-2-3.

ADLOG11B lists all of our advertisers, with current information for issue #11. (It is revised for each issue.) Each column represents one piece of information on the advertisers—whether they're advertising; the size and shape of the ad; the page; the reader service number; and the description to be used in the Index to Advertisers. (No math is performed on this file, and some of the cells are empty.)

BUSCIRCA calculates how many subscriptions will be active for each issue, for the next 50 issues of *Buss* newsletter. (Assuming, pessimistically, that no one renews.) Addition is performed on the data in this file, and neighboring cells are referenced.

RSC9ART computes the popularity of the articles in *Sextant* #9, from the ratings on the reader service cards. (Similar files exist for other issues.) Several ratings are calculated, according to different criteria. (E.g., percentage of respondents who read a given article; average rating of an article, including and excluding respondents who didn't read the article.)

SEXCIRC4 performs the same calculations for *Sextant* that BUSCIRCA performs for *Buss*.

SPRINT10 checks the bill from our printer, compares it to their estimate, and calculates the cost per thousand magazines printed. The rows contain the items broken down on the bill; and the columns give the charges per unit, whether they apply to the current bill, and if so, how many there are.

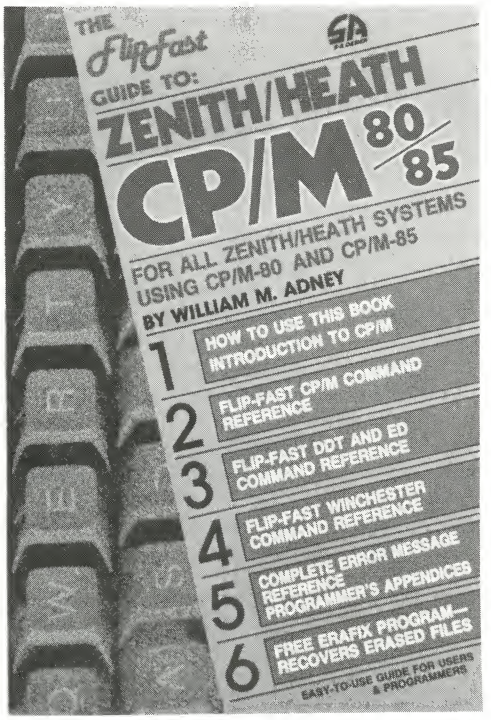
DCDOES83 calculates Sextant's unemployment-tax bill for each quarter.

BENCH1 is a spreadsheet benchmark used in *Sextant* #4, Winter 1983 (p. 50). It is used to measure the time it takes a change to go through a spreadsheet. Lotus 1-2-3 was twice as fast as the fastest 8-bit spreadsheet measured in that survey.

For both spreadsheet and data base management, Lotus 1-2-3 is faster than any comparable programs that we are aware of—as can be seen from running BENCH1.

File	Rows	Columns	Bytes on disk	Available	Bytes in RAM
ADLOG11B	174	11	27,776	40,342	24,518
BUSCIRCA	51	7	12,800	56,968	7,892
RSC9ART	16	10	4,992	61,397	3,463
SEXCIRC4	24	8	5,632	60,678	4,182
SPRINT10	20	7	4,224	62,074	2,786
DCDOES83	19	7	3,456	62,728	2,132
BENCH1	100	4	12,800	51,394	13,466

Table 1. Memory requirements of some of the files used with Lotus 1-2-3 at Sextant. Each number under "Available" is the amount of memory Lotus tells us is available after each file is loaded into RAM. "Bytes in RAM" was derived by subtracting "Available" from the amount of memory available before each file is loaded (64,860).


THE FlipFast GUIDE TO:
ZENITH/HEATH
CP/M 80/85
FOR ALL ZENITH/HEATH SYSTEMS USING CP/M-80 AND CP/M-85
BY WILLIAM M. ADNEY
1 HOW TO USE THIS BOOK
INTRODUCTION TO CP/M
2 FLIP-FAST CP/M COMMAND REFERENCE
3 FLIP-FAST DDT AND ED COMMAND REFERENCE
4 FLIP-FAST WINCHESTER COMMAND REFERENCE
5 COMPLETE ERROR MESSAGE REFERENCE
PROGRAMMER'S APPENDICES
6 FREE ERAFIX PROGRAM—RECOVERS ERASED FILES
EASY-TO-USE GUIDE FOR USERS & PROGRAMMERS

Finally!

A Convenient Guide to CP/M-80 and CP/M-85 Written Specifically for Users of the Heath/Zenith '8, '89, '90, '110, and '120.

The FlipFast Guide to Zenith/Heath CP/M 80/85

Published January 1984
by S-A Design Books
190 pages

Spiral bound so pages turn easily and lie flat—lets you flip around quickly to find the information you need, then stays open flat to the page you want.

Convenient 5½" × 8½" size leaves you more room next to your computer than standard binders.

You'll find the following information for each CP/M command or subcommand:

- The required **syntax** with available options
- Its typical **applications**
- Specific **examples** with explanations of command functions
- A listing of command **requirements** for correct/best operation
- **Application notes** about specific usage
- **Error message** listing of command-specific error messages

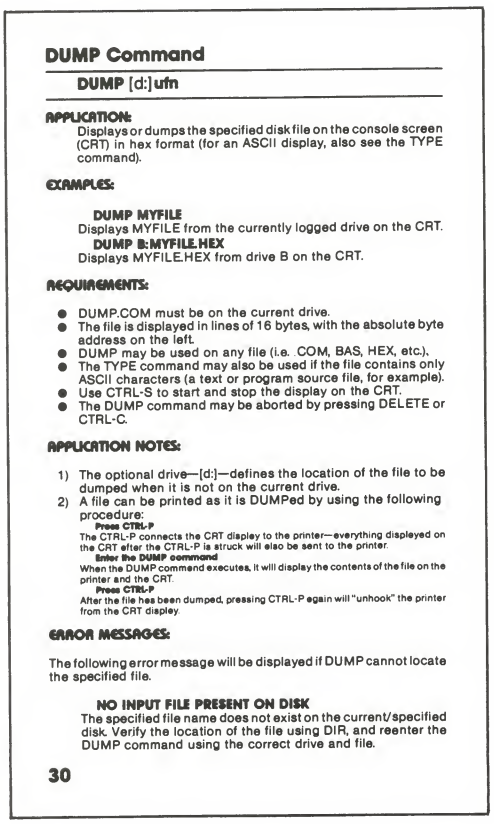
And you can easily refer to listings of:

- CP/M 2.2 system calls 0–40
- BIOS jump table
- 8080/8085 op codes in both alphabetic and numeric order—with decimal, hex, and ASCII equivalents
- Escape sequences and key functions of the Heath/Zenith '19, '89, '90, '110, and '120

Plus:

Additional technical information on the Disk Parameter Block, Disk Parameter Header, File Control Blocks, CP/M memory addresses for various memory sizes, and the contents of the first page in memory.

Features a 6-page index of error messages.



DUMP Command

DUMP [d:]ufn

APPLICATION:
Displays or dumps the specified disk file on the console screen (CRT) in hex format (for an ASCII display, also see the TYPE command).

EXAMPLES:

DUMP MYFILE
Displays MYFILE from the currently logged drive on the CRT.
DUMP B:MYFILE.HEX
Displays MYFILE.HEX from drive B on the CRT.

REQUIREMENTS:

- DUMP.COM must be on the current drive.
- The file is displayed in lines of 16 bytes, with the absolute byte address on the left.
- DUMP may be used on any file (i.e. .COM, BAS, HEX, etc.).
- The TYPE command may also be used if the file contains only ASCII characters (a text or program source file, for example).
- Use CTRL-S to start and stop the display on the CRT.
- The DUMP command may be aborted by pressing DELETE or CTRL-C.

APPLICATION NOTES:

1) The optional drive—[d:]—defines the location of the file to be dumped when it is not on the current drive.
2) A file can be printed as it is DUMPed by using the following procedure:
Press CTRL-P
The CTRL-P connects the CRT display to the printer—everything displayed on the CRT after the CTRL-P is struck will also be sent to the printer.
Enter the DUMP command
When the DUMP command executes, it will display the contents of the file on the printer and the CRT.
Press CTRL-P
After the file has been dumped, pressing CTRL-P again will "unhook" the printer from the CRT display.

ERROR MESSAGES:

The following error message will be displayed if DUMP cannot locate the specified file.

NO INPUT FILE PRESENT ON DISK
The specified file name does not exist on the current/specified disk. Verify the location of the file using DIR, and reenter the DUMP command using the correct drive and file.

30

Circle #246 on Reader Service Card

☐ **Send me** ____ **copies of** *Zenith/Heath CP/M 80/85*

@ $12.95 ea. = $ _____

+ $2.50 ea. shipping (U.S./Canada) = $ _____

or

+ $4.00 ea. overseas shipping = $ _____

Total = $ _____

☐ Payment enclosed (checks must be in U.S. dollars payable on a U.S. bank).

☐ Charge my: ☐ Visa ☐ MasterCard

Card # _____

Expires _____

Name _____

Address _____

_____

_____

Mail this card today to:

Sextant Publishing Company
716 E Street, S.E.
Washington, DC 20003

S12-C

☐ **Send me** ____ **copies of** *Zenith/Heath CP/M 80/85*

@ $12.95 ea. = $ _____

+ $2.50 ea. shipping (U.S./Canada) = $ _____

or

+ $4.00 ea. overseas shipping = $ _____

Total = $ _____

☐ Payment enclosed (checks must be in U.S. dollars payable on a U.S. bank).

☐ Charge my: ☐ Visa ☐ MasterCard

Card # _____

Expires _____

Name _____

Address _____

_____

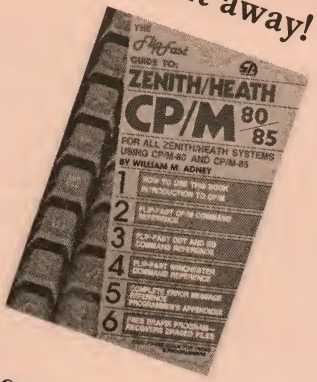
_____

Mail this card today to:

Sextant Publishing Company
716 E Street, S.E.
Washington, DC 20003

S12-C

Send me my copy of
The Flipfast Guide to:
Zenith/Heath CP/M 80/85
right away!

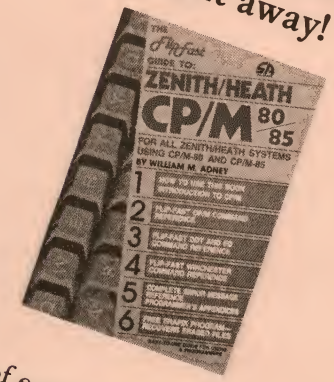


Featuring:

- 190 pages of easy-to-access information for Heath/Zenith users
- Specific information for each CP/M command or subcommand
- Easy-to-use listings and tables
- A 6-page index of error messages

Fill out the reverse side of this card and order your copy today, from
Sextant Publishing Company
716 E Street, S.E.
Washington, DC 20003

Send me my copy of
The Flipfast Guide to:
Zenith/Heath CP/M 80/85
right away!



Featuring:

- 190 pages of easy-to-access information for Heath/Zenith users
- Specific information for each CP/M command or subcommand
- Easy-to-use listings and tables
- A 6-page index of error messages

Fill out the reverse side of this card and order your copy today, from
Sextant Publishing Company
716 E Street, S.E.
Washington, DC 20003

CONTENTS

1—*FlipFast*® INTRODUCTION 5
Preface 6
How To Use This Book 7
Introduction To CP/M 9

2—*FlipFast*® CP/M COMMAND REFERENCE 17
ASM 18
BSYSGEN—CP/M-85 20
CONFIGUR—CP/M-80 23
CONFIGUR—CP/M-85 25
DIR 29
DUMP 30
DUP 31
ERA 34
FORMAT—CP/M-80 35
FORMAT—CP/M-85 37
LIST 40
LOAD 42
MAKEBIOS—CP/M-80 44
MOVCPMnn—CP/M-80 46
MVCPM207—CP/M-85 48
PIP 50
PREL 55
REN 57
SAVE 58
SETLP—CP/M-80 59
STAT 60
SUBMIT 64
SYSGEN—CP/M-80 66
SYSGEN—CP/M-85 68
TYPE 70
USER 71
XSUB 72

3—*FlipFast*® DDT AND ED COMMAND REFERENCE 73
DDT Command 74
Assemble 76
Display 77
Examine 78

Fill 80
Go 81
Input 82
List 83
Move 84
Read 85
Set 86
Trace 87
Untrace 88
ED Command 90
Append 93
Beginning/Bottom of Buffer 94
Beginning of Line 95
Characters Forward/Backward 96
Delete Characters 97
Delete (Kill) Lines 98
End 99
Extract/Copy Lines 100
Find Next String Occurrence 101
Find String 102
Head New File 103
Insert 104
Insert String 105
Juxtapose 106
Lines Down/Up 107
Macro 108
Original File 109
Quit 110
Read Library File 111
Sleep 112
Substitute Range 113
Substitute String 114
Type Lines 115
Type Pages 116
Upper/Lower Case 117
Verify Buffer Space 118
Verify Line Number 119
Write File 120

4—*FlipFast*® WINCHESTER COMMAND REFERENCE 121
ASSIGN—CP/M-80 122

CONTENTS—(Continued)

ASSIGN—CP/M-85 125
BACKUP/RESTORE (BRS)—CP/M-80 128
BACKUP—CP/M-85 134
MVCPM217—CP/M-85 138
PART—CP/M-85 140
PREP—CP/M-85 143
RESTORE—CP/M-85 146
SHIP—CP/M-85 149
VERIFY—CP/M-85 150

5—ERROR MESSAGES AND APPENDICES 153
Error Message Cross Reference 154
Appendix A—CP/M 2.2 System Calls 160
Appendix B—8080 Op Codes—Decimal Listing 163
Appendix C—8080 Op Codes—Alphabetic Listing 168
Appendix D—CP/M Technical Information 173
Appendix E—Key Functions & Escape Sequences 176
Appendix F—Glossary 179

6—ERAFIX PROGRAM 181
How To Use ERAFIX 182
ERA Command 184
ERAFIX Listing 186

ERAFIX UPDATE POSTCARD 191

ABOUT THE AUTHOR ..... COVER III

Order your copy of *The FlipFast Guide to Zenith/Heath CP/M 80/85* today, for only $12.95 plus shipping and handling. If you're not completely satisfied with the book, just return it to us within 30 days for a full refund.

Please enclose payment with order. We accept checks (in U.S. dollars payable on a U.S. bank), money orders, Visa and MasterCard.

Fill out the coupon below, and mail it with payment to:

Sextant, Dept. S12,
716 E Street S.E., Washington, DC 20003

☐ Send me _____ copies of *Zenith/Heath CP/M 80/85*

@ $12.95 ea. = $ _____

+ $2.50 ea. shipping (U.S./Canada) = $ _____

or

+ $4.00 ea. overseas shipping = $ _____

Total = $ _____

☐ Payment enclosed (checks must be in U.S. dollars payable on a U.S. bank)

☐ Charge my: ☐ Visa ☐ MasterCard

Card # _____ Expires _____

Name _____

Address _____

_____

_____

Sextant, Dept.S12, 716 E Street S.E., Washington, DC 20003

Sextant *Back Issues are Still Available!*

There's a wealth of information about your Heath/Zenith system in the back issues of *Sextant*. Order yours today!

Send me:

☐ **Premiere Issue (Spring 1982)**—including "A Parallel Interface for the '89," and "Disk Programming *Without* HDOS."
☐ **Issue #2 (Summer 1982)**—including "Crucial Secrets of HDOS," and a preview of the Z100.
☐ **Issue #3 (Fall 1982)**—including "The World's Fastest Sort?"
☐ **Issue #4 (Winter 1983)**—including "Interrupt Programming Under HDOS."
☐ **Issue #5 (Spring 1983)**—including "CP/M: The First 13 System Calls."
☐ **Issue #6 (Summer 1983)**—including "Pascal Elucidated" and a look at assembly language "Inside A Spooler."
☐ **Issue #7 (Fall 1983)**—including a roundup of over 80 software products for the Z100.
☐ **Issue #8 (Winter 1984)**—including a roundup of nearly 50 games for Heath/Zenith computers and an introduction to Z-DOS assembly language.
☐ **Issue #9 (March-April 1984)**—including "Why Won't All That IBM-PC Software Run on My Z100?" and "Build a Sound/Clock Board for Your '89."
☐ **Issue #10 (May-June 1984)**—including a roundup of educational software.
☐ **Issue #11 (July-August 1984)**—including a review of the IBM-compatible Z150 and a survey of four letter-quality printers under $1,000.

@ $3.50/issue* = $ _____ Please enclose payment with order.

☐ Payment enclosed. (Checks must be in U.S. dollars payable on a U.S. bank.)

☐ Charge my: ☐ Visa ☐ MasterCard
Card # _____ Expires _____

Issues will be sent by first class mail immediately upon receipt of payment.
*Please include $3 additional for each issue to be mailed overseas.

Name _____

Address _____

_____

Clip this coupon and send it today to: Sextant, Dept. S12, 716 E Street S.E., Washington, DC 20003

Circle #103 on Reader Service Card

T3D3

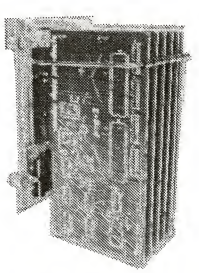
Probably the most sophisticated 3-D Tic-Tac-Toe game you'll ever play!
- *Full Color Graphics*
- *Fast (Machine language)*
- *Rotate the playing cube in the X, Y or Z axis*

Requires ZDOS, color option, ROM Version 1.2 or above.

Full price just **$24.95***

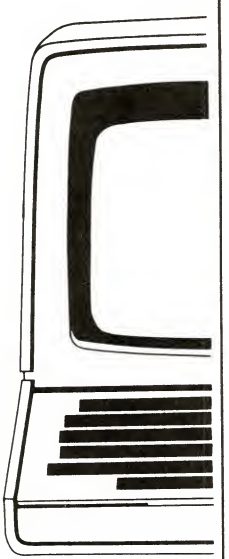
by
WESTCOMP
517 N. Mountain Ave.
Suite 229
Upland, CA. 91786
(714) 982-1738
*Foreign orders add 20% for shipping/handling.
*CA residents add your sales tax!

Circle #235 on Reader Service Card



H89/Z90's CAN NOW DEAL WITH A FULL DECK!

THE ORIGINAL ALL-IN-ONE ACCESSORY BUS EXPANDER.



MH89+3 doubles expansion capacity. Allows for 6 right-hand type cards instead of the usual 3. Room at last to run those neat accessory boards you've seen advertised!

Piggyback motherboard installs internally with a screwdriver in just minutes – with no modifications! 3 slots exactly duplicate the originals. The 3 added slots occupy unused addresses and eliminate previous conflicts. 100% compatible with all accessory boards!

No overheating problems! Simple design draws little power. Leaves plenty of overhead for the minimal load of most accessories. Full technical information provided.

The best news about this "No-hassle" design is the price — **ONLY $150.** About 1/3 the price of other solutions!

Price includes assembled and tested MH89+3 expander, complete instructions and one (1) year warranty. CA residents add 6% tax. USA include $5 shipping. Foreign add $10. Telephone and COD orders accepted.

mako data products
1441-B N. RED GUM, ANAHEIM, CA 92806
PHONE (714) 632-8583

Circle #154 on Reader Service Card

with patterns.

The only disappointment is the pie graph, which is only available as an outline. You have a choice of several types of graphs besides the pie graph. You can also have line, bar, stacked bar, and X-Y graphs. Each of these is easy to set up and manipulate to meet your needs.

Printing

You need to do more than just look at the graphs you produce on the screen if they are to reach their potential. Lotus 1-2-3 makes it possible to print out the graphs you see, so that you can show them to others as well. A number of dot-matrix printers and color plotters are supported by the current version of Lotus 1-2-3, including printers from Epson, Okidata, and M.P.I. Plotters by Hewlett-Packard, Houston Instruments, and Sweet P are supported for those who want color graphics. (Letter-quality printers such as the Diablo 630 are not supported, despite their graphics capability.)

Nearly any printer will do for printing the spreadsheet. This does not require any special features. When you start up your system, though, one of the first things you must do is tell Lotus 1-2-3 what sort of printer you have, in order to print graphics. This is in addition to the communications information you have given your operating system through the use of CONFIGUR.COM.

You also have the opportunity to have Lotus 1-2-3 send your printer a special set-up string. This string may set your printer so that it will create a smaller typeface, for example. The earlier copies of Lotus 1-2-3 had a bug that prevented this feature from working; but Zenith has provided an update to fix this problem. Make sure that you get an updated copy when you buy Lotus 1-2-3.

Documentation

It's pretty obvious that Lotus 1-2-3 was originally written for the IBM Personal Computer when you read the documentation. While most of the drawings have been updated, as have the pictures of the keyboard, the typographical conventions still make this fact obvious. For example, a doohickey that looks like ←┘ (a familiar sight to IBM users) means you're supposed to hit the key marked RETURN on the Z100's keyboard. If you see →| you're supposed to hit the TAB key. I could go on, but you get the idea.

The manual appears to be a slightly enlarged photocopy of the original. Zenith has thoughtfully provided a keyboard template and a quick-reference manual, and these help a lot. Otherwise, the manual is well written and is excellent. References are easy to find, and the examples are usually quite useful. The table of contents and the index are exceptional. You probably can find whatever you need in the table of contents. If not, you will certainly find it in the index. I suspect that Zenith left this manual alone because there was little that could be improved.

A program's help files are not usually considered part of the documentation. This is because most help files provide little help. The help files in Lotus 1-2-3 are exceptional. In every instance, you can find comprehensive explanations of the functioning of the program. You also have the opportunity to explore related topics.

You can press either the HELP key or the F1 key to receive help from the program. As soon as you do, you are presented with a screen full of text describing the proper operation of the portion of Lotus 1-2-3 where you were last working. You also have a list of other topics that you may choose to read about. You highlight your choice with the arrow keys, and make your selection. If the portion of Lotus 1-2-3 involves graphics, then the help file will show you graphics, too.

This help file is not simply a repetition of the manual. The information is presented in a completely different manner that takes advantage of the on-line environment. This is the reason that you have graphics in the help files, and the ability to branch off into related topics. It's too bad that most other programs lack this impressive level of help for the user.

Problems

It's regrettable that even the best of programs have a few problems. Lotus 1-2-3 is no exception; although in this case, the problems are few. In fact, part of what makes Lotus 1-2-3 such a fine system also contributes to a possible problem. That possible problem is memory—or rather, the lack of it.

In certain quarters, 1-2-3 has gained the reputation for being "memory hungry." That's not too surprising—1-2-3 does practically all its work in RAM. This may be unusual for a data base, but it's customary for spreadsheets. Both the program and the data are held in

Notes for Z150 users

Now comes the part of this article where you get the good news and the bad news. The good news is that nearly everything I said about the Z110/120 version of Lotus 1-2-3 is also true of the version for the Z150 and Z160 computers. The bad news is that the Z100 version won't work in those computers.

The version of Lotus 1-2-3 that runs in these computers is the same as that which you get for the IBM Personal Computer. You can get it from nearly any software vendor, including some Heathkit Electronic Centers. Due to the heavy competition for this program, you will probably be able to save some money on this version.

The biggest difference you'll see in the IBM version is copy protection, which means that you have to use your distribution disk or the backup disk that Lotus provides to run the program. You can no longer make two or three working copies of a program and then lock away the distribution disk where it will be safe from harm. Instead, you must use it every time you use Lotus 1-2-3. You may want to give this serious thought before you find yourself depending heavily on a copy-protected disk for which there is only one backup.

Another difference is the manual. Instead of getting a thick gray manual from Zenith, you get a thick gray manual from Lotus. It does come with a slip case, and it's a little shorter and narrower, but there's little difference otherwise. It's still an excellent manual. I find that the slightly smaller exterior dimensions fit my table more conveniently, and it fits on a bookshelf more easily, too.

If you're used to the exceptional graphics ability of the Z110/120, then you'll notice some difference there, too. The IBM-PC graphics provided by the Z150 are not as good—you can see the results in the graphs on your screen. When you design graphs with a large number of data points, it gets hard to separate the individual points in some cases. A bar graph with over 50 bars is very difficult to read, for example.

A more noticeable side effect is the size of the letters and numbers in the titles and labels. These are much larger than they are in the Zenith version, and they run together sooner when you pack a lot of data into a small graph. You will also see a difference on a spreadsheet when the screen is scrolled from side to side. Instead of moving smoothly, each time you go a cell past the edge of the screen, the entire screen is repainted.

You may gain one advantage, however, by using the PC version of Lotus 1-2-3. At least one test indicated that it makes better use of the computer's memory. Using one particular spreadsheet, on a Z150 and on a Z110, both with 192K, the Z150 had somewhat more space available.

Lotus 1-2-3 is still an exceptional program either way, and will be well worth the cost to many users.

Alternatives to Lotus 1-2-3

If Lotus 1-2-3 is as good as I say it is, why am I talking about alternatives? Because the price of Lotus 1-2-3 is rather high, especially if you don't need some of its features. It can cost twice as much as the alternatives. In addition, Z110/120 and Z150 users have a number of more recent packages from which to choose, and some of those compete favorably with Lotus 1-2-3.

A good example of this is Sorcim's SuperCalc 3. This is the latest version of the venerable SuperCalc line, and has a lot to recommend it. Nearly everything offered by Lotus 1-2-3 is offered by SuperCalc 3 as well. You do give up a few things, however. For example, the maximum size of the spreadsheet is smaller, and the help files are less extensive.

On the other hand, the manner in which SuperCalc 3 uses memory is such that you actually have a larger spreadsheet available for your use. You also have some options in the way SuperCalc 3 manages your computer's memory, so you can make the decision to trade performance for capacity. Other options allow you to choose simultaneous display of the spreadsheet and graphics if you have two monitors.

Right now, SuperCalc 3 is only available for the IBM Personal Computer and compatibles such as the Z150. But the manual already includes instructions for installing the program on other Zenith terminals. And Sorcim says that a version for the Z110 and '120 should be along soon.

If you can do without the graphics for now, you may want to consider Microsoft's Multiplan. This program is available for most Heath/Zenith computers, including the H8 and H/Z89. And it may be the best spreadsheet available without graphics.

With Multiplan, you get features that other companies are still trying to copy, such as windows into different parts of your spreadsheet, and the ability to link different spreadsheets. This linking ability means that you are no longer limited to available memory for your spreadsheet. You can simply take the results from one spreadsheet and pass them on to another one.

You are not entirely without graphics with Multiplan. There are graphics packages available that can use a disk file from Multiplan as input. In addition, Microsoft says that they are planning a graphics package for 16-bit machines that can use Multiplan's files.

Turn your Z-100 or Z-150! into a:

3101

VT100

D200

with Zstem SMART Terminal Emulator

Including:

Disk File Transfers: ASCII & XMODEM

Parallel & Serial Printer Support

Full Softkey(MACRO) Support

ZSTEM-VT52 ..... $ 98.95

ZSTEM-VT100 ..... $148.95

ZSTEM-3101 ..... $128.95

ZSTEM-D200 ..... $124.95

VISA and Master Card accepted.
Quantity and dealer discounts available.

KEA SYSTEMS LTD.
Department ZS-7
#311-811 Beach Avenue
Vancouver, B.C. CANADA V6Z 2B5
(604) 687-2744 9-5 PST Mon-Fri

D200 is a trademark of Data General Corporation
VT is a trademark of Digital Equipment Corporation

Circle #175 on Reader Service Card

memory at all times. That makes for speed in processing, but it does impose limits. With 1-2-3 loaded into a 192K Z100, there is about 64K left over for data. If you were going to have a file with more than that, you would need to install a 256K RAM expansion card.

Having said that, 1-2-3 may sometimes be getting criticism where it's not deserved. For instance, formatting your spreadsheet "prudently" is more important with 1-2-3 than with some other spreadsheets. You can format up to a maximum of 2,048 lines. But if you're not going to use that many, don't format for them. 1-2-3 will cheerfully reserve space for those lines you'll never use. So format for the amount of space you think you'll use, or be prepared to waste memory uselessly.

To give you some idea of typical memory requirements for a small business, you might want to take a look at the comments accompanying this article, "Lotus 1-2-3 at Sextant." There, they discuss some of the files they have.

Assuming your requirements are not much greater than Sextant's, you shouldn't encounter memory problems. If your files do nudge the Z100's memory limits, though, you may not be aware of it while you're working on the file. 1-2-3 doesn't tell you the amount of memory space you have left, until you run out. You can find out the status of the computer's memory, of course, but you have to ask. Most spreadsheets tell you the percent of memory still available; but Lotus 1-2-3 doesn't tell you a thing until it is all used up. As critical as memory is to a spreadsheet, this information should be called to your attention.

The reason for the next problem is less obvious. When Lotus makes changes to its spreadsheet, a blank area "ripples" its way down the screen. This is not very fast and I find it quite distracting, especially compared to the changes that take place in similar systems like SuperCalc and Multiplan. These spreadsheets simply change affected cells as required. There is no need to have an area of change pass through the entire screen.

Only the first of these problems is significant, but that one can cost you a lot of money. Memory expansion boards are not cheap. And when combined with the cost of the program, they make for an expensive proposition. Otherwise, the problems are not enough to keep anyone from buying the program. They are irritations, of course, and it would be nicer to do without them, but they don't impair your ability to use the software.

Conclusions

Lotus 1-2-3 is an exceptional piece of software, and it's easy to see why it has had such an impact on the marketplace. Until it came along, there had never been anything like it in the microcomputer industry. Now that Lotus 1-2-3 has been on the market for several months, the competition has started to arrive. So far, though, most of this competition has been in the IBM-PC marketplace, and for now, Lotus 1-2-3 has the Z100 world all to itself.

If you need the capabilities of Lotus 1-2-3, this is not a bad situation at all. 1-2-3 may perform nearly all of the data manipulation your business is likely to need. If you need a more powerful way to handle data, you're in luck there, too. The designers of Lotus 1-2-3 made sure that their product could share information with dBASE II. You can also transfer information from other spreadsheets, so you won't lose all that work you put into your VisiCalc files, for example, when you change over to Lotus 1-2-3.

This is one of those few products that I can recommend without reservation. It is deserving of all the attention that it has received over the past year or so.

Ordering Information

Lotus 1-2-3 for the Z110/120 and Z150/160, $495. Z110/120 version is available from the Heathkit catalog and from most Heathkit Electronic Centers; the Z150/160 version is available from some HECs and stores that sell software for the IBM PC.

ZRT

Telecommunication Software For The Z100 Using Z-DOS
• VT52 Emulation • File Encryption and Conversion
• Automatic Modem Control

Use ZRT as a Z-DOS utility to interconnect the Z100 computer to other systems or Z100 users. Single key call and logon, single key disconnect and return to Z-DOS when used with an intelligent modem. Set and forget configuration setups. Setup and modem commands are file organized, no menus are used. Z-DOS batch commands may be used to select configuration, default auto connection and terminal emulator by name.

- Auto call and command/response files
- Send, append, and receive files at speeds to 2400 baud
- Files displayed as sent or received by host system
- Handshake protocol programmable—no handshake required
- Function key control of all on-line functions
- 25th line function banner—changes to entry, status, and error display
- HELP key support and on-line help screens for all functions
- Record dialog to disk and printer
- Confidential file handling—convert any file to an encrypted ASCII number list file—30,000 keys
- Clean up, decipher, and word processor conversion of files
- On-line file manipulation—kill, list, display, and print files
- Other features—color, buffered printing, key click and auto repeat control, SCROLL key, true BREAK, half/full duplex, VT52 key pad and display option

"Professional Quality—Personal Price"

Sigma Technology Co.
491 Breezewood Drive, State College, PA 16801 U.S.A.
Tel: 814-238-3321 for information only

To order diskette and documentation send $29.95 U.S. check or money order. Shipped postpaid U.S. and Canada, allow 2 to 4 weeks delivery time. PA residents add sales tax. Foreign orders add $10.00 for non-U.S. check and airmail.

Z100 and Z-DOS are tradenames of Zenith Data Systems, Inc.
VT52 is a tradename of Digital Equipment Corporation.

Circle #247 on Reader Service Card

HOW MUCH FREE SOFTWARE COULD YOU USE?

FIND OUT WITH OUR GIANT PUBLIC DOMAIN DIRECTORY

- SUPPLIED ON DISK FOR EASY COMPUTER ACCESS
- MORE THAN 4,500 ENTRIES
- SUBJECT AREAS INCLUDE:

ASTRONOMY, AVIATION, BUSINESS, EDUCATION, ENGINEERING, GAMES, GRAPHICS, HAM RADIO, MUSIC, PROGRAMMING, TEXT EDITING, VOICE SYNTHESIS, UTILITIES AND MUCH MORE.

Yes! I need to know what free software is available. Send me the public domain directory on the Heath CP/M* 5¼ format checked ☐ ON 3 HARD SECTORED SD $17.00 ☐ ON 2 SOFT SECTORED DD $12.00 ☐ ON 1 DOUBLE SIDED DD $7.00

No risk, money back guarantee. Add $2.00 domestic, $4.00 foreign for shipping and handling.

Enclose your money order or check in U. S. funds with your order. Sorry, no phone or credit orders.

HEADWARE
2865 AKRON STREET
EAST POINT, GA. 30344

Name

Address

City, State, Zip

*CP/M Reg. TM Digital Research Corp.

Circle #192 on Reader Service Card

DISKSORT
Sort any Disk File
Fast and easy-to-use stand-alone SORT utility. 30+ page manual with many examples. Specify: ZDOS CP/M HDOS. $49.95

E.A.SY
Executive Appointment Secretary
Time management made EASY. Throw away your appointment book and keep your schedules the EASY way. Specify ZDOS CP/M HDOS IBM KAYPRO. $49.95

ZDOS TOOLS
Three Programs for your H/Z-100
UNDERLINE text on your screen
SORT your ZDOS directory
Display serial port status. $24.95

DUALPORT
Connect a 2nd Terminal to your Heath/Zenith computer. Specify ZDOS CP/M HDOS. $39.95

ZBERT
Fast Action Video Arcade Game and Graphics Editor. Requires ZBASIC and full video RAM. $29.95

S-BASIC
Write Structured BASIC Programs
You'll wonder how you ever wrote programs without S-BASIC. Specify ZDOS CP/M HDOS. $49.95

COLOR GAMES
Enjoy "Othello", "Battleship", "Blackjack", "Isolation", and "Yahtzee" in color. Requires ZDOS/ZBASIC and full video RAM. $24.95

ZDUMP
Edit your ZDOS disks in Hex or ASCII using cursor control keys. $29.95

CALL FOR CURRENT PRICING ON 'NEW' Z-150 COMPUTERS.

SUNFLOWER SOFTWARE, INC. (913) 631-1333
13915 Midland Drive, Dept. S4, Shawnee, KS 66216

VISA MasterCard

SUNFLOWER SOFTWARE, INC.
13915 Midland Drive, Dept. S4
Shawnee, KS 66216 (913) 631-1333

☐ Please, send me a free catalog
☐ H8 ☐ H/Z89 ☐ H/Z100

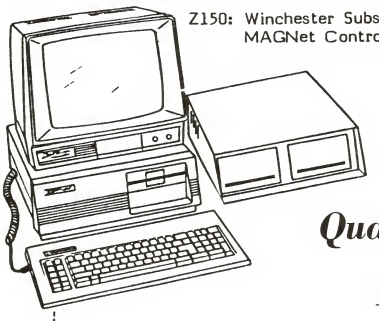
NAME _____
ADDRESS _____ APT _____
CITY _____ STATE _____ ZIP _____
☐ VISA ACCT # _____
☐ M/C EXP DATE _____

ITEM	FORMAT	PRICE

Kansas 4½% tax _____
Shipping/Handling 2.00
Amount Enclosed _____

Circle #171 on Reader Service Card

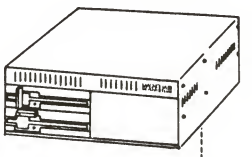
MAGNOLIA MICROSYSTEMS



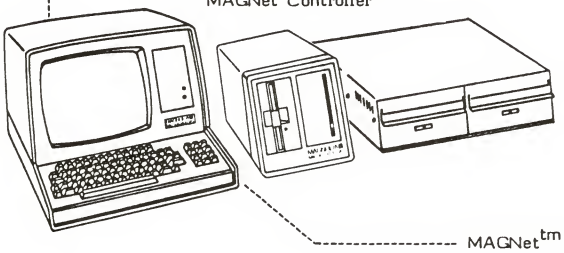
Quality Enhancements

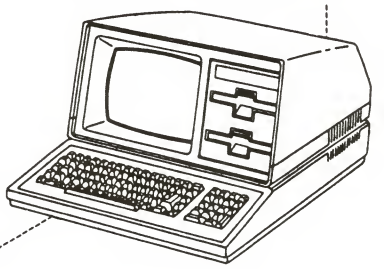
For Heath/Zenith Computers

Since 1979



MAGNet





MAGNet

MAGNet tm

MAGNOLIA MICROSYSTEMS, INC. • 2264 - 15th Ave West
(206) 285-7266 (800) 426-2841 • Seattle, Washington 98119

MAGNet is a trademark of Magnolia Microsystems, Inc.
CP/M Plus is a trademark of Digital Research, Inc.

Circle #134 on Reader Service Card

Double the Speed of your H/Z89-90
Cut computing time by as much as 50%

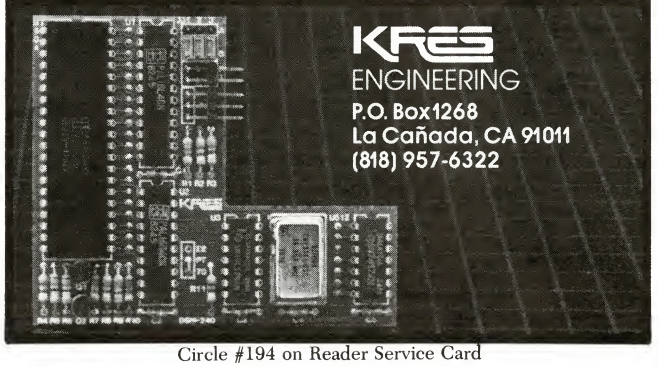
Fast Operation
With the Dual Speed Module, software that used to be slow and inefficient now zips right along. Run programs like SuperCalc (in "auto mode") and Spellstar without long waits.

Easy
Simply replace your existing microprocessor IC with the Dual Speed Module and stop wasting time. Installation requires no trace cutting or soldering.

Fully Supported
Software support for CP/M, HDOS, AND CP/M + Works with Magnolia Microsystems*, CDR, and many other disk systems.

Dual Speed Module DSM-240 $99.97**
+ $3.50 shipping and handling (includes CP/M *or* HDOS; add $10.00 for both).

*Requires Software Patch PMM-100 $49.95 and Monitor ROM KMR-100 $59.95
**All prices subject to change without notice.
CP/M is a registered trademark of Digital Research.



KRES ENGINEERING
P.O. Box1268
La Cañada, CA 91011
(818) 957-6322

Circle #194 on Reader Service Card

Graphics For Z-100 AND Z-150

FlexiTek Tektronix 4010 Emulator

Use your Z-100 or Z-150/160 to access mainframe graphics packages. Draws fast. Selectable baud rates to 9600. Complete set-up menu for terminal parameters. Capture graphics to disk. Print out on dot-addressable matrix printer using FlexiPrint (included FREE, see below!) OR send picture to HP plotter. You get TWO versions, one for Z-100, and one for PC-compatibles such as Z-150/160. Z-100 version uses 400-line interlace mode, with 35 lines by 74 column text, a very close imitation of the 4010. The PC version supports only 32 lines of text, and 200 lines res, but otherwise is similar. PLUS you get ALL source code (MASM), so you can see how it's done, modify it if you wish, or use our drawing routines for output from your own programs.

Notes: Some 4010 packages for the Z-100 claim more lines of resolution. We deliberately avoided this since many Z-100s have only 32K video RAMs and cannot support greater than 400 line res. In any case, greatly exceding 400 lines stretches the ability of your monitor to sync, and may obscure the edges of the picture. Also, some packages advertise more than 35 lines of text. This may make diagram labels come out in the wrong locations. Changing features, and configuration for non-standard graphics boards, is possible with FlexiTek, usually by changing EQUates in our source files. Requires ZDOS/MSDOS/PCDOS 1.25 or above.

Price as of July 1, 1984: $129.95

FlexiPrint Screen Printer:

Print out screen graphics on dot-addressable printer. You get -100 AND PC-compatible versions. Activated at any time by Sh-F12 or PrtSc, or triggerable by your own programs. You get source code (MASM), so you can make versions for almost any printer by changing EQUates. We pre-configure versions for OKI-92 etc., EPSONs, C-ITOH, NEC, Apple Imagewriter etc. You can also choose dumps of Z-100 hi-res, normal-res, PC screen, color-to-grey translation, or dumping of any arbitrary area of memory. Requires ZDOS/PCDOS/MSDOS 1.25 or above.

Price as of July 1, 1984: $34.95

For more info send business-size SASE. Dealer and local author enquiries welcomed. **ORDERING:** Please add tax (Cal res only, 6%) first, then shipping and handling ($3 per item in U.S. or Canada, elsewhere $12). Check or money order OK, money order only outside U.S. (sorry Canadians).

VariousWare

VariousWare
P.O. Box 21070
El Cajon, CA 92021
(619) 448-7126

IBM would like you to think of them when you see 'PCDOS'. Likewise Zenith for 'ZDOS', 'Z-100'.

Circle #186 on Reader Service Card

Introduction to Pascal: Part 2

This installment covers user-defined functions as well as those built into Tiny Pascal.

William Tavolga

Here is the second installment in our series on the remarkable powers of Tiny Pascal. It's aimed at the BASIC programmer who's thinking of moving up to Pascal. Learning Tiny should be a good (and inexpensive) background to learning any of the full-size Pascals.

Those of you for whom Pascal would be your first language may also want to follow along. But you'll probably also want to check out some of the texts available on Pascal. A short bibliography with comments by *Sextant*'s technical editor, John Walker, was included with the first installment in this series in issue #11, July-August 1984.

In the first installment, we looked at some general points of Pascal programming, and discussed the program block, variables, array variables, the assignment code, other symbols, procedures, and conditional statements.

In this installment, we'll take up various kinds of loops and repetitions, functions (user and built-in), and console control.

For the sake of consistency, I shall use the identifier NL for the new-line code 10. Under the Heath Disk Operating System (HDOS), this code is adequate to generate both a carriage return and a line feed. But under CP/M, you must send both code 13 and 10.

We shall assume that the beginning of any program includes the statement:

CONST NL=10;

(A CP/M program will also include CONST CR=13.)

Loops and repetitions

A major virtue of computers is their incredible patience with repetitious tasks. Accordingly, every computer language has one or more forms of loops. The one most familiar to BASIC users is, of course, the FOR... TO... NEXT... iteration.

Tiny Pascal, like its big brothers, has three forms of the loop. The familiar form takes much the same syntax as in BASIC:

FOR I:=1 TO 100 DO

Note the use of the assignment symbol := and the DO at the end. There is no NEXT... as there is in BASIC. What follows can be a single statement (ending with a semicolon), or another program block enclosed within a BEGIN... END;. Whatever is enclosed in the block will be repeated. The value of I will not be anything predictable after the loop is finished, however.

```
FOR I:=20 DOWNTO 2 DO
    BEGIN
      A:=I*I;
      WRITE('Square of ',I#,' is ',A#,NL);
    END;
```

Listing 1: You can use DOWNTO to count backwards. This fragment will list the numbers 20 to 2, and their squares.

```
WHILE (Q>='A') AND (Q<='Z') DO
  BEGIN
    WRITE('Enter a keystroke & <cr> : ');
    READ(Q);
    WRITE('entry was ',Q);
  END;
WRITE(NL,'That''s all folks!');
```

Listing 2: Any single statement or program block can follow the WHILE . . . DO. . . . This fragment will continue to loop as long as the key entered is from A through Z. Any other character entered will be printed to the screen and the loop will be broken.

```
CONCN;      ! character input - no echo !
WRITE('Enter keystroke Y or N : ');
WHILE  (A <> 'Y') AND (A <> 'N')
  DO  READ(A); ! loop will continue until right input !
WRITE(A,10);
```

Listing 3: This fragment requires a "Y" or "N" input. It will proceed only after an acceptable keystroke.

The initial and final values of the variable counter can be numbers or expressions, just so long as the first is smaller than the second. If you want to count backwards, as from 100 to 1, you can use the word DOWNTO instead of TO.

An example is given in Listing 1. This will list the numbers 20 to 2, and their squares. As noted in the first installment, your step size is always limited to one. So if you need to skip counts, you will have to devise another counting instruction within the block.

A second loop mechanism may be familiar to the users of Microsoft BASIC version 5. This is like the WHILE... WEND... loop; but in Tiny Pascal it becomes:

WHILE A=2 DO

The A=2 statement can be replaced by any Boolean operation, just as used in the IF... THEN... constructions. As above, any single statement or program block can follow the DO. An example is given in Listing 2; this program fragment will continue to loop so long as the key entered is from A to Z (inclusive). The first time it gets anything else, that character will be printed to the screen, but then the program will go on to the next statement. (In the last statement of Listing 2, notice the use of the double '' to make it print a single '.)

One parenthetical comment about Boolean operations should be added here. If you set a variable to equal 1 (or any odd number, + or–), e.g., BOOLE:=1;, then you can use the forms:

IF BOOLE THEN WRITE('yes');

WHILE NOT BOOLE DO ...

NOT BOOLE assumes BOOLE=0 (or any even number, + or–), while just BOOLE assumes it has an odd value. This is equivalent to the "false" and "true" designations of Boolean variables found in higher Pascal languages. This is also a handy way to test if a particular variable has an odd or even value. Note that if your Boolean statement is a multiple one with a connecting AND or OR, you must use parentheses around each equation.

Listing 3 provides a useful program fragment that requires a "Y" or "N"

```
REPEAT
    WRITE('Enter a keystroke & <cr> : ');
    READ(Q);
    WRITE('entry was ',Q);
UNTIL (Q<'A') OR (Q>'Z');
WRITE(NL,'That''s all folks!');
```

Listing 4: This fragment does exactly the same job as the WHILE . . . DO . . . example in Listing 2.

```
I:=0;                          ! zero the counter !
REPEAT
  I:=I+1;                      ! increment our counter !
  WRITE('Enter keystroke & <cr> : ');
  READ(A[I]);      ! enter Ith character into array !
UNTIL (A[I]<'A') OR (A[I]>'Z');
```

Listing 5: This fragment will also print the first value received outside the A-Z limits.

input, and will only proceed after an acceptable keystroke.

A third loop is also available to you, and it takes the form:

REPEAT
  program block
UNTIL boolean operation is true

In this case, the BEGIN... END; is not necessary, since the REPEAT... UNTIL... serves as its own block indicator. An example is given in Listing 4. The fragment there will do exactly the same job as the WHILE...DO... example does in Listing 3.

In both cases, the last iteration of the loop will include a printout of the Q value that was outside of the A-Z limits. This can be a bit of a nuisance in a case like the one in Listing 5.

In the situation in Listing 5, the last element of the array will be a character outside the A-Z limits. Suppose you entered, in order, the characters: Q W E R T Y 8. The loop will end *after* the 8 is entered. Consequently, the value of I (the length of the array) will be 7. If you wish next to print that array, but not the exiting character, you have to say:

```
FOR J:=1 TO I-1 DO     ! reduce range I by one !
  WRITE(A[J]);
```

This feature of reiterations is an important one to understand. And depending on your needs, the inclusion of the last iteration can be either a nuisance or a blessing.

The advantage of the FOR... TO... DO... loop is that the counting is done for you by the statement range. The WHILE... DO... and REPEAT... UNTIL... loops give you greater flexibility in controlling the loop, making it open to external directives. In Tiny Pascal, both of these execute faster than the FOR... TO... DO... loop. I made up a number of different timing programs, and found that the REPEAT... UNTIL... loop is about twice as fast as the FOR... TO... DO... loop, and WHILE... DO... is somewhere in between. This is not necessarily true for other Pascal versions.

Functions: user defined

Tiny Pascal has no special mathematical functions like BASIC's SIN(X), ABS(X), etc. This is because the numerical type available is strictly limited to integers. To get around this limitation, one can set up evaluations that can be called up as FUNCTIONs. These are like PROCEDUREs (described in the first installment); and the syntax for the two is similar.

Normally, a PROCEDURE is used to perform some task that involves logical operations, printing or screen formatting, or generally non-numerical evaluations. The FUNCTION, however, is used to perform an arithmetic or numerical task. The differences between the two sometimes become cloudy, and often both can be written to perform the same task. It is preferable, however, to use the FUNCTION when numerical computations are involved.

An example of a FUNCTION might be Listing 6, a program to give squares. If by chance you enter a number whose square will go beyond the integer limits (32,761, or 181^2) you can put in a Boolean variable to catch the error. In Listing 7, we shall dress the program up and include a PROCEDURE by contrast with a FUNCTION.

A useful FUNCTION to have in your library would be the equivalent of BASIC's absolute-value function, ABS(X). One way to do it would be as follows:

```
FUNC ABS(X);
  BEGIN
    IF X<0 THEN X:=-X;
    ABS:=X;
  END;
```

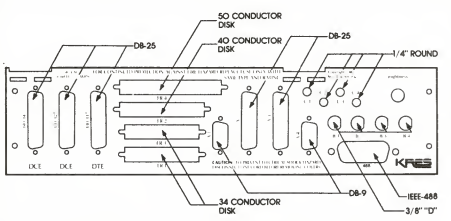
Once this is in your program, you can call it up just as you would do in BASIC. You can substitute any number, variable, or expression for X, just so long as you don't exceed the integer limits.

Functions: built-in

Tiny Pascal does have a few procedures and functions as part of its lexicon. Most of these have been introduced into version 4.1 by Mike Kroska. (Some special graphics functions have been added by Fred Pospeschil, but we'll not consider them in this series.)

CALL(memory location);—This instruction makes the program jump to a specified memory location, usually given in split-octal (hex in CP/M version). For example: CALL(%040134). The instructions beginning at that memory location should normally end with a RETURN opcode, and the control will then return to the next instruction in your Pascal program.

CHAIN('filename');—This is much like CHAINing in some versions of BASIC. Since Tiny has no defaults, the file name must be completely given, with dev:,

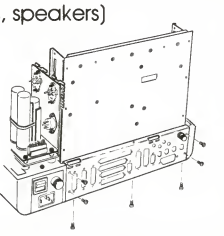


The RBP-200 is a functional replacement for the existing backplate on the H/Z89-90. It installs in minutes with just a screwdriver. For very old H88s an adaptor is available to allow use of the RBP-200 Backplate.

RBP-200 $35.00 plus shipping
California residents add 6% sales tax.

The BACKPLATE a neater solution from KRES

DB-25	Printers, modems, parallel ports, RS-232, general purpose
34 Conductor Disk	5¼" disk drives (H-77, H-37 and similar cables)
40 Conductor Disk	H-47, H-67 and similar cables
50 Conductor Disk	Standard 8" drive cables. A must for Magnolia and CDR users
DB-9	Joysticks, color monitors, analogue signals A/D, D/A, RS-422
¼" Round	Audio output (music, sound generators, speakers) microphones, BSR system X10, control
⅜" "D"	Video, color monitors, analogue signals A/D, D/A, any application requiring shielded cable
IEEE-488	Instrument control and laboratory communication



KRES ENGINEERING • P.O. Box 1268 • La Cañada, CA 91011
(818) 957-6322

Circle #128 on Reader Service Card

name, period, and extension. The result is that any open files are closed, and the new program is loaded and executed. For example:

```
CHAIN('SY0:MBASIC.ABS').
```

DISIN;—This is the command to disable interrupts. Needless to say, use with great caution. And follow up with:

ENINT;—This is the command to enable interrupts.

EXIT;—This command can be placed anywhere in the program. If you are in the main program block, it will cause an exit to the HDOS system mode. If you are within a subroutine, it will skip over the rest of the routine and return to the next command line of the main program. (In CP/M, EXIT; will produce a system return to CP/M from any point in the program.) This command should be used sparingly (mainly as an error trap) because variables and other factors may be left in some undesirable condition.

MEM[location]—This permits you to PEEK and POKE any memory address. Note the use of [ ] rather than parentheses. You can use any number (or equivalent expression) from 0 to 65535; or 0 to %377377 (octal under HDOS), 0 to %FFFF (hexadecimal under CP/M). Whether you PEEK or POKE depends on which side of the assignment symbol you put your MEM[X].

To PEEK: A:=MEM[X];

To POKE: MEM[X]:=A;

(In either case, caution must be observed or you can PEEK/POKE yourself into oblivion.)

PAUSE(number)—With a 2-megahertz central-processor unit, this special function will provide a pause in the program in units of 2 milliseconds. If you are using some other speed, you will have to do some simple calculations to figure out how long the pause will be. Then calibrate your program accordingly.

PORT[portnumber]—PORT (like the MEM function) uses [ ]. With it, you can either output or input at a specified port.

To output: PORT[%350]:='3';

To input: A:=PORT[%350];

Functions: console control

Normally, the console is in a line-reading and echo mode. What this means is that when you use the READ(A); function, each keystroke you enter gets saved in the type-ahead buffer and also printed on the screen (echoed). When you hit RETURN, the buffer is cleared. Meanwhile, variable A has been assigned the value of the first keystroke. If the program includes subsequent READ statements, or if you are READing a sequence of array variables, then each next available variable in your program will be filled as you go along.

Take, for example:

```
FOR I:=1 to 10 DO
   READ(A[I]);
READ(B);
```

If you enter 10 keystrokes and then RETURN, the "string" you have typed will be represented by the array of A[1] to A[10]. If you enter only five keystrokes before NL, the value of A[6] will be 10 (that is, NL), and the program will wait for you to finish all 10 keystrokes. The NL counts as a keystroke. However, if you go beyond 10 and put in, say, 11 keystrokes before NL, there will be one left over. If you have another read statement following, it will be used. In the example above, that extra keystroke will be saved as variable B.

```
VAR   NUMBER : INTEGER;     ! declare your variable !

FUNC SQUARE(X);      ! note possible abbreviation of FUNCTION !
           ! define the function with a dummy variable X !
  BEGIN
    SQUARE:=X*X;       ! do the computation !
  END;

BEGIN          ! main program !
 REPEAT
  WRITE('Enter number : ');
  READ(NUMBER#);     ! input your number !
  WRITE(NL,'Square of ',NUMBER#,' = ',SQUARE(NUMBER)#);
      ! write the message with function call included !
 UNTIL NUMBER=0;    ! leave yourself a way to get out !
 END.
```

Listing 6: This user-defined FUNCTION will calculate the square of an integer.

```
! PROGRAM : DEMO !           ! you can give it a title !

   VAR   NUMBER, SQNUMBER, ERROR : INTEGER;
              ! declare your variables !

   PROC CLRSCR;      ! procedure to clear the screen !
     CONST  ESC = 27;    ! declare a constant !
     BEGIN
       WRITE(ESC,'E');
     END;

   FUNC SQUARE(X);      ! note abbreviation possible !
             ! define the function with a dummy variable X !
     BEGIN
       IF X>181 THEN      ! check if square will overflow !
          BEGIN           ! block to print error message !
            WRITE(NL,'Number exceeds limit.',NL);
            ERROR:=1;        ! and assign 1 to ERROR variable !
          END  ELSE     ! note lack of semicolon here !
            SQUARE:=X*X;       ! do the computation !
     END;

   BEGIN          ! main program !
     CLRSCR;    ! call clear screen procedure !
     REPEAT
       ERROR:=0;  ! assign ERROR variable as 0 !
        ! why here rather than ahead of REPEAT ? !
       WRITE('Enter number : ');
       READ(NUMBER#);     ! input your number !
       SQNUMBER:=SQUARE(NUMBER);
          ! you can use separate variable for the square !
       IF NOT ERROR THEN
          WRITE(NL,'The square of ',NUMBER#,' is ',SQNUMBER#);
     UNTIL NUMBER=0;
   END.
```

Listing 7: The program to give squares (Listing 6) can be dressed up to include a PROCEDURE as well as a FUNCTION. The FUNCTION here checks to make sure that the number input is not too large to be squared.

Since there is no string capability in Tiny Pascal, the only way you can create strings is by using character arrays, as in the example above.

Ten keystrokes followed by NL will, in effect, give you a string of 10 characters in the form of the array A[1] to A[10]. However, you still have that troublesome eleventh entry that will slide into the next variable that you will want to READ.

There are ways out:

CONCL;—This is a command to clear the

Diamond

Complete Small Business Accounting package includes A/R, A/P, G/L. Inventory and Purchase Ordering are available. System is menu-based for easy operation, and includes user's manual with detailed installation and initialization sections.

Invoices, Statements, Past Due, Mailing Lists, Profit & Loss, and more are all included. Price is $150 postpaid for Z-DOS, $75 ppd for HDOS. Manual alone: $25 ppd.

Z-UTIL

Includes IBM PC Emulator for Z-100 plus Screen dump for Epson, Gemini C.Itoh 8510, NEC-8023, Microline, and MPI. Plus TP mini-editor program. $35 postpaid.

UPC

User Programmable Characters Drivers allow you to print the H/Z-19/89/90 graphics set on the printer, or design your own character sets. Now includes double height & double width for graphics, charts, etc. $25.00 postpaid. See below for ordering information.

ULTIMATE PRINTER DRIVERS

Allow changing print fonts, modes from within text - New Easy Installation. $20.00 ppd.

DRIVER ORDERING INFO.

Specify Epson, Gemini, MPI, Microline, or Paper Tiger. Also specify CP/M or HDOS. Drivers above only for Heath 8-bit computer systems. Specify hard or soft sector 5" disk.

Write for FREE software & hardware catalog. Payment via check or money order. (Please certify checks over $200). All checks must be drawn in U.S.funds on a U.S. bank.

LINDLEY SYSTEMS
21 Hancock St.
Bedford, MA 01730
Phone (617) 275-6821 6-10 PM

Circle #132 on Reader Service Card

C

Getting Started
Examples & Functions

New version for MS-DOS includes library with IBM-PC and Z100 graphics for CI-C86 v2 compiler. Structured, indexed collection of over 70 examples and functions for learning the C programming language. Data types, declarations, preprocessor, expressions, looping, relational tests, arrays, pointers, strings, functions, macro definitions, structures, bitwise, I/O, and customization to features of specific computer systems. Library of essential source codes is applicable to most standard C compilers with little or no modifications. Manual includes hints and comments for conversion between popular compilers such as C/80, BDS-C, Aztec, DRC and CI-C86. Available in two versions:

for CP/M (Z90,Z100 - SSDD 5" Disc) $39.95
for MS-DOS (IBM-PC, Z100 - DSDD 5" Disc) . . . $39.95

Send check or money order. 6.5% tax for California residents.

EIGENWARE TECHNOLOGIES
13090 La Vista Drive
Saratoga, CA 95070
(408) 867-1184

C and Pascal Compilers
Programming Editors

Write or call for low prices.

Circle #125 on Reader Service Card

WATCHWORD

VERSION 2

The word processor and full screen editor for the Z100 and ZDOS.

NEW FEATURES:

- *Files of arbitrary length*
- *Extensive configuration facility*
- *Multiple fonts loaded from ALTCHR files*
- *Support for ZDOS Version 2 subdirectories*

Plus all of the features of Version 1 including: superscripts, subscripts, underlining, boldface, centering, formatting, microjustification, arbitrary line length with horizontal scrolling, word wrap, auto save, split screen, macros, user settable defaults and definable keys, global search and replace with settable zone.

For additional details, send a SASE.
Demo Disk: $3.00
WatchWord with Manual: $100.00

S & K Technology, Inc.
4610 Spotted Oak Woods
San Antonio, TX 78249
512-492-3384
ATTN: Steve Robbins

Circle #230 on Reader Service Card

console buffer and any characters that have been left hanging like that eleventh character. When using the READ function, it is good practice to sprinkle some CONCLs around, even just ahead of the READ.

CONLN;—This will disable the echo part of the READ function. So you will not be able to see what you are typing until you specifically WRITE that variable or array to screen. Once you give this command, this mode will remain until you cancel it.

CONLE;—This is the normal (default) mode of input via the READ function. Use this command to cancel CONLN and return to normal console operation.

CONCE;—Here is another way of getting around the left-over keystroke problem. This command puts you into a character-echo, rather than line-echo, mode.

Using CONCE in the program fragments above, each keystroke will show on the console; but when you reach 10, the program will automatically continue to the next instruction statement. Nothing will be left over. Since a NL counts as a keystroke, the appropriate variable in the array is simply assigned a value of 10 and the NL is performed on the screen. Without CONCE, the loop would continue until all ten iterations were performed, even if you gave it the NL before then.

This might seem like a great way to accumulate a string array, but there are some difficulties. First, you are required to use *all* the elements of the range and fill up the variable. You can get around this by using the REPEAT or WHILE operations, and select some way (such as a NL, for example) to exit the loop. For example:

```
CONCE;
  I:=0;
  REPEAT
    I:=I+1;
    READ(A[I]);
  UNTIL A[I]=NL;
```

In this instance, the last element in the array will be equal to NL; and the array length I will include that last element. If you want to get rid of NL, you can always follow this with the statement LENGTH:=I-1;.

However, there is still another problem. To the READ function, any keystroke is as good as any other keystroke, and this includes the BACKSPACE and DELETE keys. If you try to use either of these, they are included in the array, and the echo is confused: DELETE does nothing and BACKSPACE moves the cursor back a notch. In any case, these are assigned (value 8 or 127) to the pending element of the array.

Since there is no string capability in Tiny Pascal, the only way you can create strings is by using character arrays.

The use of the special function keys on your terminal adds even more problems. These keys send *two* keystrokes, an escape (27) and another value. As you might guess, these will occupy two successive elements in your array.

You can, of course, put instructions in the program block to catch all these odd-ball events, and act appropriately. A simple string-entry program block now rapidly becomes a complex monster. The best technique would be to set up special PROCEDUREs to do these things.

The other way to handle this, using the line-echo mode, is to use the CONCL; instruction. In the line-echo mode, what you see is what you get: the BACKSPACE and DELETE keys do what they normally do instead of getting put in the array.

```
CONLE;
I:=0;
REPEAT
  I:=I+1;
  READ(A[I]);
UNTIL A[I]=NL;
CONCL;
```

By the way, if you are using a READ(X#); statement, then the CONCE; command has no effect. You must enter your number and then NL in any case. If you enter a character, you will get an INPUT ERROR message, and have to do it again.

CONCN;—This function is available only in the HDOS version. It puts the READ into a character-input mode and disables the echo. Its closest relative in BASIC would be: X$=INPUT$(1). If you want to see what your keystrokes are, you have to use the WRITE function. The same difficulties and advantages exist here as with CONCE;.

Listing 8 provides a useful program employing CONCE;. It can be used as a subroutine to send data from the keyboard to the screen a line at a time. The data to be handled by this program can be a string of up to 255 characters in length if you set your terminal width for that.

You can now do anything you want with this string—but remember that it is really an array. So you have to save its length, or pad the remainder of the array with zeroes to fill it up. Padding of an array (in this case, STRING, used in the listing above) can be done ahead of time by the instruction:

```
FOR I:=1 TO 80 DO STRING[I]:=0;
```

PRINT: output to printer

Assuming you have named your HDOS printer driver as LP.DVD, you can replace any WRITE command with PRINT, and the output will be routed to your

THE USUAL 50¢ PER STROKE OK, HARRY
SURE...
SO THIS SEVEN IRON AND A THREE QUARTER SWING WILL BE OUR BEST SHOT ... RIGHT ZENITH?
CORRECT.
I'VE NEVER SEEN YOU PLAY THIS WELL BEFORE, HARRY.
YA... PROBABLY THAT NEW FIVE-WOOD, FRANK... THANKS.

PAYROLL $195

A flexible payroll package including labor cost accounting for the H/Z-100, H/Z-89* or H-8*. Price includes custom installation of state taxes. (Send state tax information with order.) Requires CP/M*, CBASIC*, 64K and two disk drives.*

CP/M FILE TRANSFER UTILITY - $25

Transfer disk files between systems with incompatible media formats. Transfer is via serial ports (requires RS-232 cable, not supplied). Software supplied on both hard and soft-sectored 5.25" CP/M diskettes for use on H/Z-100, H/Z-89, or H-8. Transfer to/from non-H/Z systems.

H-17* DISK SUPPORT SYSTEM - $~~95~~

A complete CP/M disk diagnostic and data recovery system for H-17 hard-sectored disk drives

- file unerase
- bad sector lockout
- soft error report
- disk error map
- measure disk speed
- measure head seek
- disk verification
- sector editor
- copy bad files
- test disk status
- test disk control
- and others

Z-100 DISK SUPPORT SYSTEM - $65

A diagnostic, error recovery, and file manipulation package for H/Z-100 5.25", 48tpi disks. Requires CP/M-85.

- on-screen sector editor
- diskette verification
- file unerase
- bad sector lockout
- display soft error counter
- measure disk speed
- file compression/decompression
- diskette contents mapped by track, sector
- disk exercising with error reporting
- transfer files to/from other CP/M systems
- compare two disk files
- and others

THE SOFT FIRM

$39 NEW LOW PRICE

Terms: check, money order, or Mastercard/Visa
Price includes shipping
MS add 6% sales tax

THE SOFT FIRM

P.O.Box 1125 Picayune, MS 39466 (601)798-0740

* CP/M, CBASIC tm DRI - H17, H8, H/Z89, H/Z100 tm Heath/Zenith

Circle #219 on Reader Service Card

ASSEMBLER CAN BE FUN

Announcing the* OMNICODER™ *Assembler

Meaningful prompts. Descriptive error messages. Unlimited nesting of INCLUDE and macro. Macro definitions with both positional and keyword parameters. Global macro symbols. Subscripted macro symbols. User controlled disk search order. Symbols up to eight characters. List and display files can be directed to terminal, printer, or disk. Uses disk work files for expansions. Produces object modules to be linked by linkage editor. Object format designed to be compatible with multiple processors (up to 32-bit addressing) in order to support planned additions (initial release will only assemble Z80® code).

System Requirements
Z80®. 64K. CP/M®. One or two disk drives (depending on drive and storage capacity). Formats: 5-inch hard or soft-sectored (48 t.p.i.), 8-inch.

Future Plans
We plan to add multiple CPU and MNEMONIC capabilities. This assembler is intended to become part of our PANDORA OPERATING SYSTEM (watch for announcement).

Ordering Information
Price: $90 per site (USA only, no foreign orders). Ohio residents add 5.5% sales tax. MC®/Visa®: include name, number, expiration date, signature, and phone number. Allow six to twelve weeks for delivery. Send order to:

MOCKINGBIRD DATA SYSTEMS
2296 Hoover Rd.
Grove City, OH 43123

Trademarks: Zilog: Z80®. Digital Research: CP/M®. Heath Company: HDOS™. Mockingbird Data Systems: OMNICODER™, PANDORA™.

Circle #242 on Reader Service Card

VT100 Performance for H19/Z19

The HT100 firmware upgrade to Heath H19/Zenith Z19 permits running of software programs written for DEC's VT100 and VT102 (e.g., DEC's EDT and KED screen editors). This is an inexpensive way of obtaining VT100 performance at about half the cost (H19/Z19 + HT100) of DEC's VT100. The HT100 firmware has been extensively tested on DEC's VAX and PDP-11 computers for several man years. Included: 3 ROMs, Reference Manual/Installation Guide, APL keycap labels (with APL option), EDT Keypad Editing Reference card.

Features of HT100 Upgrade:

- **ANSI and DEC VT100 Escape Sequences**
  Hardware limitations: normal and reverse video character attributes only, no programmable tabs, no smooth scroll, and no 132 column display. All DEC escape sequences understood and accepted.
- **VT52 Escape Sequences**
- **VT100 Style Setup Mode**
- **VT100 Graphics Characters**
- **Control Character Display Mode**
- **APL Char Set with Overstrike ($5 Option)**
- **Thorough and Clear Installation Guide**

Dealer inquires are welcomed. Large quantity discounts available.

For information or ordering:

MicroFirm, Inc.
Rockefeller Center Station P.O.
P.O. Box 1276
New York, N.Y. 10185

Make check payable to: MicroFirm, Inc.
$95 for HT100, add $5 for APL Option
New York State residents add applicable tax

Circle #207 on Reader Service Card

```
! PROGRAM : STRING !

VAR   STRING : ARRAY [80] OF INTEGER;
   I, LENGTH : INTEGER;   ! declare array and variable !

BEGIN
  WRITE(27,'E','Enter string : ');
             ! clear string and print prompt !
  CONCN;     ! set no-echo char. input mode !
  I:=0;      ! zero the counter !
  REPEAT     ! start the loop !
    I:=I+1;  ! count !
    READ(STRING[I]);  ! input keystroke !
    IF (STRING[I]=8) OR (STRING[I]=127) THEN
             ! catch BACKSPACE or DELETE !
       BEGIN
         I:=I-2;  ! backup the counter !
         WRITE(8,' ',8);
             ! backspace, write space & backspace !
       END ELSE
             IF STRING[I]<>27 THEN
              ! catch an escape code
                & print if printable !
                WRITE(STRING[I]);
  UNTIL STRING[I]=NL;    ! end the loop if return is hit !
  LENGTH:=I-1;           ! adjust for true string length !
  FOR I:=1 TO LENGTH DO ! now print the string you saved !
     WRITE(STRING[I]);
  WRITE(NL);
END.
```

Listing 8: Employing CONCE, this program can be used as a subroutine to send data a line at a time from the keyboard to the screen.

printer. There is, however, the problem of the size of your printer buffer, and what is the appropriate command to clear its buffer and close the file. In most cases, if you make your final printer output PRINT(26) (CTRL-Z), this should be adequate to signal an end-of-file. Sometimes, the appropriate command is CALL(%70311), which flushes the buffer. In every case, the end of a program will do it. Otherwise, you can treat the printer as a file to write to. (We shall take that up in the next installment under input/output operations.)

In the CP/M version of Tiny Pascal, with the printer device designated as LST:, the PRINT command works flawlessly for virtually any printer.

Control C and B

In the HDOS version, you can always use CTRL-C to stop the program and return to the system command mode. All files are closed; but if you have changed your terminal modes, you may have to type ESC z to return to normal power-up configuration.

The CTRL-B function is particularly handy; it closes all files and restarts the program from scratch. Unfortunately, the CP/M version does not have either of these features, although CTRL-C sometimes works by way of invoking a "warm-boot."

Shift left, shift right

Two additional operators are found in Tiny Pascal. These can best be understood if you consider a byte in terms of its binary digits, and simply shift all the bits over one place—left or right. (Assembly-language hackers will see the similarity of these commands to the rotate-right and rotate-left opcodes.)

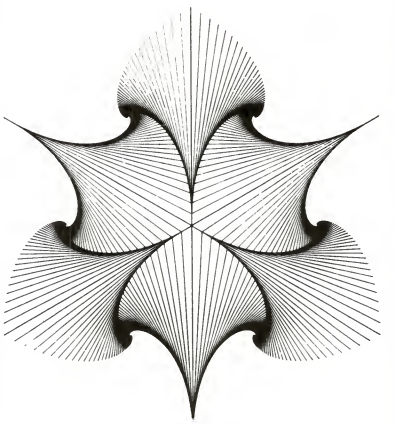
The operators use the form:
A:=A SHL 1; (A is shifted, bit-by-bit, one place left.)
A:=A SHR 1; (Here, the shift is one place right.)

This is a shift, not a rotation, so that any bits shifted off are sort of lost down the edge of a cliff. The number of places shifted can be anything up to 8. A one-place shift to the left is equivalent to multiplying by 2. The use of these operators is to isolate the position of a particular bit and test for it. (A place "emptied" by the shift is zeroed.)

And next time . . .

In these first two installments, we have looked at what might be called how a program in Tiny Pascal talks "to itself." In the next installment, we'll look at how Tiny talks to the disk: in addition to input/output operations, we shall cover the memory assignments, user program areas, and system access calls.

At the end of that, there will be a program, CRYPTAID.PAS. It will serve as a sort of "working" review of what we've covered here. And if you're a cryptogram addict (as I am), it will act as an infinitely erasable scratch pad to help you work (and create your own) cryptograms.



V·GRAPH
TEKTRONIX 4010
GRAPHIC EMULATOR
FOR YOUR
ZENITH Z·100

V-GRAPH is your link into the world of powerful, high resolution graphics. Now your personal computer can act as a Tektronix 4010 terminal.

Not just an emulator, V-GRAPH can save graphics and text on disk and replay or print it later without reconnecting to the host computer.

V-GRAPH provides an equivalent for every function found on the Tektronix, including the cross-hair cursor used for graphic input. Plus, control and function keys may be programmed to emit commonly used character strings - saving you time with logon sequences and host computer commands.

V-GRAPH supports the highest resolution possible, and is currently available for the IBM PC, Zenith Z-100 and Victor 9000. Requires 64K of memory and MS-DOS. $120

Your link into the world of high·resolution graphics

CompuView
PRODUCTS, INC.

1955 Pauline, Ann Arbor, Mi48103
Telephone (313) 996-1299

Circle #223 on Reader Service Card

1984 SPRING/SUMMER CATALOG

If you'd like to receive one of the most comprehensive catalogs related specifically to Heath-Zenith products, call us today! We'll send you our fully illustrated 24 page catalog free for the asking.

Some of the items you'll find include the Zenith Data Systems line of Z100 and Z150/160 computers as well as systems hardware and software accessories. Plus our own line of add-on peripherals such as thinline eight-inch drive subsystems at really great prices. Featured are some of the best prices around on MPI printers, Z100's, Tandon and Qume disk drives and premium quality Dysan diskettes. New products include the Prism line of high speed color printers, U.S. Robotics' S100 modems, Z100 color graphic game software, Transtar letter quality printers and more.

We've been serving the Heath-Zenith community since 1979. We're an authorized Zenith Data Systems dealer and MPI distributor and service center. Our reputation for fast service and excellent support is our most important asset!

We have thousands of happy customers, including some of the largest corporations in the world, governmental agencies and some very distinguished universities. Just call or write, and we'll be happy to send our new catalog out the same day.

Local Customers — Visit Our Retail Store!

999 South Adams
Birmingham, MI 48011
Phone (313)-645-5365

ZENITH | data systems

Circle #249 on Reader Service Card

INTELLIBURNER

EPROM–EEPROM–MICROCOMPUTER PROGRAMMER

UNIVERSAL PROGRAMMING CAPABILITIES AT AN AFFORDABLE PRICE

- **Ultra Fast Programming – 2716's in 16 Seconds**
- **Programs & Verifies 8K thru 256K Single Voltage EPROMs**
- **Erases, Programs & Verifies 2815/16/17 EEPROMs**
- **Programs & Verifies 8748 and 8751 Series MICROCOMPUTERS***
- **Programming Chracteristics Selected by Convenient Personality Jumper Plug (DIP Header)**
- **Program, Verify, Status, & Diagnostic Display with Tricolor LED**
- **Serial Interface — 3, 4, or 5 wire — 1200 to 19200 Baud**
- **Supports XON/XOFF and READY/BUSY Protocols**

NO SPECIAL SOFTWARE REQUIRED. Transfer disk files (Intel Hex Format) to EPROM with your system's line printer or modem software. Transfer EPROM contents to disk file in Intel Hex Format with your system's modem software. Or use the supplied software ** to transfer any binary or ASCII file to/from EPROM.

PROGRAMS:

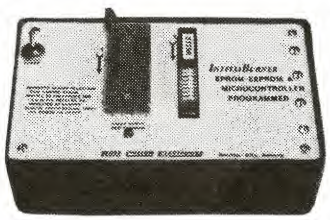
2758	2716	27128	27C16	8741*	8748*
2516	2732	27128A	2815	8742*	8749*
2532	2732A	27256	2816		8751*
2564	2764	68764	2817		8755*

*Requires low cost personality adapter.

SOFTWARE AVAILABLE FOR: **

CP/M systems on 8" SSSD - many 5¼ formats
TRS-80 Model I & III TRSDOS
Heath H8/H89 HDOS & CP/M
ZENITH Z90 & Z100 CP/M - Z100 ZDOS
KAYPRO II/IV
IBM PC-DOS

IntelliBurner Programmer with Software	$ 269.00
RS-232 Interconnect Cable	9.00



Low Cost "DumBurner" serial programmers harness the power of your personal computer with the supplied software for full programming capabilities:

DumBurner II Programmer for 28 Pin and 24 Pin EPROMs and EEPROMs(with Software)	$ 189.00
DumBurner II Bare PC Board, Plans & Software	39.00
16K/32K DumBurner for 24 Pin EPROMs (with Software)	139.00
16K/32K DumBurner PC Board, Plans, & Software	25.00

ROSS CUSTOM ELECTRONICS
1307 Darlene Way - Suite A12
Boulder City, Nevada 89005
PHONE (702) 293-7426

Add $2.00 Shipping & Handling; C.O.D.s accepted; Foreign Orders add required postage. Specify Environment and Media Requirements. H8, H89, Z100 are TM Heath/Zenith; CP/M is TM Digital Research. TRS-80 Model III is TM Tandy Corp. IBM-PC and PC-DOS are TM International Business Machines.

Circle #152 on Reader Service Card

H/Z-100 AND 150 PC GRAPHICS SOFTWARE

MICROSERVICES continues to expand its support of Heath/Zenith computers.

For H/Z-100s:

ZANIMATE. Make color animation sequences using ZBASIC **$64.95**

ZPALETTE. Draw images in 92 colors using ZBASIC. **Improved** with 3 painting modes and graphics generator..... **$59.75**

ZPATTERN. Test your color monitor..... **$24.95**

Z3D from **COLORWORKS.** Make three-dimensional objects in color **$75.00**

For H/Z-100s and 150 PCs:

SOFTKITS from **KERN INTERNATIONAL.** We are now carrying a full line of this excellent series of books and disks for graphics and business/scientific applications.

We are continuing to introduce new products. Write for our catalog.

MICROSERVICES
P.O. Box 7093
Menlo Park, CA 94026
Phone: (415) 851-3414

MasterCard VISA

Include 3% p/h ($3.00 min.). California add 6½% tax.

Circle #209 on Reader Service Card

A Canoe Ride in MBASIC

With a bit of imagination, you can pack a lot of graphics action into a few lines of programming.

Raymond Dotson

Imagine a moonlit night, a secluded lake surrounded by tall pine trees, a sleek canoe, and a romantic young couple. Can you provide a more appropriate title than "A Young Man's Fancy"?

CANOE.BAS is a program in Microsoft BASIC running under the CP/M operating system. It is designed to show the graphics potentials of Heath/Zenith's H/Z89 and '90 computer family and the H/Z19 terminal used with the H8 computer.

Here we see action graphics used in a unique story-telling fashion. An additional aim of this program is to show concentrated programming permitting maximum action in a minimum number of program lines.

As the story progresses, read into it whatever ending you fancy. Some have said the couple went for a nighttime swim. Who is to say?

The program

Perhaps your comprehension of the program content and operation can be assisted by a breakdown of the program elements.

Line 20: This line defines X0$ as the CLEAR SCREEN function, F$ as the enter-graphics-mode function, and Y$ as the direct-cursor-address function. Line 20 clears the screen, and sets the terminal print width parameter as 80 spaces. E$ is defined as a string consisting of one space.

Line 30: Here, A$ is defined as an "Enter Graphics" command plus a string of two spaces, an up-arrow, six more spaces, another up-arrow, and another space. If you check your graphics-character chart, you will see that this will become the string that forms the two heads at opposite ends of the canoe.

Still in line 30, B$ forms the actual canoe from the graphic equivalent of "_iiiiiiiiir"; while C$ is a string of eight blank spaces; and V$ is made equal to the "+".

Line 40: Z$ becomes the RESET string. P$ and Q$ respectively are given the functions of "Enter" and "Exit" reverse video mode. The cursor is turned off and T$ is given the ability to turn on graphics, reverse video, and direct cursor addressing.

Line 50: The combination of T$ and V$ followed by a single space is used to place the cursor at line 12 column 1, and turn on the graphics and reverse video. A string of 80 spaces (E$) is then printed as a bright bar across the screen, and the reverse video is turned off with Q$. The graphics equivalent of "^" is then printed at line 4, column 29. This will represent the moon in our picture.

A check is made to see if this is the first time through line 50. If so, the vertical position marker, V$, is changed to "," and the program execution is returned to line 50 to print another horizontal bar one line lower on the screen.

Line 60: T$ and the next two characters printed will place us in reverse video, graphics mode, and direct cursor addressing. So you should follow this line through to see how the pine tree is formed on the right margin of the picture.

Remember that the first character in quotes following T$ is the vertical-position marker and the second is the horizontal-position indicator. The next character(s) in quotes will be printed graphically. (Follow this through for a quick lesson in quicker graphics. The combination of T$ and the following character steps us up the right side of the screen. At first, it prints the trunk. This is followed by an ever narrowing graphics string as we go, forming an idealized pine tree.)

Remember also that a space in reverse video will print as a bright rectangle filling one graphics location.

Now that we have moonlight and a secluded lake sheltered by stately pines, what could we add to such a scene?

Line 70: Here, we set up a FOR... NEXT routine to perform lines 70-130 a total of 26 times. Then we make D$ equal to one

```
10 'CANOE.BAS by Raymond Dotson, Computer Specialties, Goldsboro, NC
20 X$=CHR$(27):X0$=X$+"E":F$=X$+"F":PRINT X0$:E$=" ":Y$=X$+"Y":WIDTH 80
30 A$=F$+"  ^       ^ ":B$="_iiiiiiiiiir":C$="          ":V$="+"
40 Z$=X$+"z":P$=X$+"p":Q$=X$+"q":PRINT X$+"x5":T$=F$+P$+Y$
50 PRINT T$V$" ";STRING$(80,E$);Q$;F$Y$"#<^":IF V=0 THEN V=1:V$=",":GOTO 50
60 PRINT T$"+o}"T$"*lr   "T$")mr  "T$"(mr  "T$"'nr "T$"&nr "T$"%or"T$"$or"
70 FOR I=1 TO 26:IF I/2=INT(I/2) THEN D$=" " ELSE D$=""
80 IF I/3=INT(I/3) THEN C6$="  y" ELSE C6$="x   "
90 IF I>=18 THEN C6$="x ":IF I=18 THEN A$=LEFT$(A$,LEN(A$)-9)+"^"
100 J$=D$+E$:A$=J$+A$:B$=J$+B$:C$=J$+C$
110 IF I>24 THEN A$=LEFT$(A$,LEN(A$)-6)+"        "
120 PRINT Y$;"* "A$:PRINT Y$;"+ "B$:PRINT P$Y$;", "C$C6$Q$
130 FOR J=0 TO I^2:NEXT J:NEXT I
140 PRINT T$"3> A YOUNG MAN'S FANCY ":V$=INPUT$(1):PRINT Z$:END
```

Listing 1: Even a very short graphics program can tell a story. This is written for Microsoft BASIC version 5.2 running under the CP/M operating system, version 2.2. It also runs under CP/M-85.

Index to Advertisers

Reader Service#		Page#
	ACCESS	
*	Discount hardware, software, supplies.	30
	Advanced Software Technologies	
210	Z100 file transfer program.	75
	American Computer	
188	Computers, printers, software.	48
	Analytical Products	
197	Utilities and enhancements for H19 and H89.	28
	***Buss* Newsletter**	
107	Heath/Zenith news 20x/year.	35
	C.D.R. Systems	
110	H8 disk controller.	15
108	CP/M BIOS modifier.	32
109	H/Z89 disk controller.	71
	Cleveland Codonics	
112	Graphics boards.	13
	CompuView Products	
223	Tektronix 4010 graphic emulator for Z-DOS.	63
	D.E.L. Professional Systems	
178	8087 speed and power booster for Z100.	back cover
	DelSoft	
102	WordStar function-key utility.	43
	D-G Electronic Developments Co.	
114	H8 and H/Z89 enhancements; Heartbeat computer.	40
	Eigenware Technologies	
125	C language support.	60
	FBE Research Co.	
116	H/Z89 hardware enhancements.	46
	First Capitol Computer	
221	Z100 and Z150 RAM chips.	71
	Floppy Disk Services	
117	Half-height drives.	85
	Headware	
192	Public domain software directory.	55
	H & H Computer Enterprises	
123	Serial/parallel interface; printers; software; hardware.	21
126	Disk storage multiplier units for H/Z89-90.	73
	Hilgraeve	
203	Communications software.	4
	Interaction Dynamics Systems	
135	Key remapping, general ledger, graphing, flight simulation software.	46
	Intuitive Logic	
177	Educational software.	45
	Jay Gold Software	
120	Home finance system.	32
	Kandueazy Computer Software Services	
141	Dust covers; tape-to-disk conversion utility.	70
	KEA Systems	
175	Z-DOS smart terminal emulator.	18, 54

*Contact advertiser directly

Reader Service#		Page#
	Kres Engineering	
195	H/Z89-90 expansion board.	29
194	Dual speed module for H/Z89-90.	56
128	H/Z89-90 replacement backplate.	58
	LabSoft	
124	Clinical laboratory data processing software.	25
	Lindley Systems	
131	Printers, supplies.	46
132	Printer drivers, Z-DOS utility package, accounting software.	60
	MacroTech International Corp.	
149	Z100 RAM upgrades.	2
	Magnolia Microsystems	
134	Network controller, Winchester subsystems, DD floppy subsystems, CP/M Plus.	56
	Mako Data Products	
154	H/Z89-90 accessory bus expander.	52
	Micro-Connection of Tampa Bay	
227	Z160 PC with hard disk.	29
	MicroFirm	
207	H/Z19 VT100 upgrade.	62
	Microservices	
209	H/Z100 and 150 PC graphics software.	64
	Mockingbird Data Systems	
242	Z80 assembler.	62
	Newline Software	
145	Software.	9
145	Graphics software.	71
145	CP/M MBASIC graphics primer.	73
145	Check processing software.	75
	New Orleans General Data Services	
*	H8 and H/Z89 accessories.	37
	Night Owl Computer Works	
198	CP/M home finance program.	80
	NORCOM	
200	H19 and H89 character generator.	76
	Northwest Computer Algorithms	
104	LISP for H89.	21
	Omni Data Systems	
201	Zenith computers, software, and accessories.	73
	Payload Computer Services	
147	Hardware, software, supplies.	33
	The PC & J Graphics Co.	
146	Printers, supplies, programming aids.	48
	Piiceon	
244	Hard disks and memory boards for H/Z100.	36
	Reichert Digital Systems	
151	Personal accounting system.	68
	Ross Custom Electronics	
152	Programmer for EPROM, EEPROM, 8748, 8751.	64
	San Diego Scientific	
181	Z100 software; 8088 speedup hardware.	25
159	Z100 game.	34

Reader Service#		Page#
	SciMed Analysis	
245	XY-plotting software.	76
	Secured Computer Systems	
157	16K memory expansion card; serial and parallel I/O for H/Z89.	12
	Selfware	
137	Disk conversion program for MS-DOS and Z-DOS.	29
	Sextant	
*	Subscriptions.	19
103	Back issues.	52
	Sextant Publishing Company	
246	Book on Heath/Zenith CP/M 80/85.	50–51
191	Book on Heath/Zenith computers.	79
	SigmaSoft & Systems	
185	High-resolution graphics controller and pseudo-disk system.	7
	Sigma Technology	
247	Z-DOS communications software.	55
	Skill Data	
*	Function key utility.	21
	S & K Technology	
230	Z-DOS text processor.	60
	Skycastle Computer Products	
218	Calligraphy programs.	14
	The Soft Firm	
219	Payroll software, CP/M file transfer utility, disk support systems.	62
	SoftShop	
162	Utilities, languages, educational software.	68
	Software Support	
164	Disk drives.	16
	The Software Toolworks	
248	HDOS and CP/M software.	42
165	C compiler for CP/M.	72
	Software Wizardry	
166	Nuclear power simulator; graphics and communications software.	26
	Studio Computers	
170	Printers; Z-DOS communications software.	10
249	Spring/Summer 1984 catalog.	64
	Sunflower Software	
171	Z150s, games, utilities, time management software.	55
	Technical Micro Systems, Inc.	
173	Z80/8086 upgrade for H/Z89.	22
	Variousware	
186	Tektronix graphics terminal emulator, graphics screen printer.	56
	Barry Watzman	
206	Dual processor MP/M-86 for the Z100.	20
206	CP/M-86 for the Z100.	44
206	Z100 CP/M Plus.	68
	Westcomp	
235	Z-DOS game.	52
	Zeducomp	
139	Structured programming tool.	83

Reader Service Card
September-October 1984

Expires December 15, 1984

Name _____

Address _____

_____

City _____ State _____ Zip _____

For further information from specific advertisers, refer to index on page 66 and circle numbers below.

100	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177	178	179
180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228	229
230	231	232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247	248	249

Please check *only* one box for each of the following questions.

Which operating system(s) do you use?

1. ☐ HDOS, Z-DOS and CP/M
2. ☐ HDOS and CP/M
3. ☐ Z-DOS and CP/M
4. ☐ HDOS and Z-DOS
5. ☐ HDOS only
6. ☐ Z-DOS only
7. ☐ CP/M only
8. ☐ MS-DOS only
9. ☐ MS-DOS and CP/M

What is your principal occupation?

K. ☐ Engineer/Scientist
L. ☐ Business Owner/Manager
M. ☐ Military
N. ☐ Programmer/Analyst
O. ☐ Educator
P. ☐ Technician
Q. ☐ Professional
R. ☐ Student
S. ☐ Government
T. ☐ Other

How did you obtain this copy of *Sextant*?

21. ☐ Subscription
22. ☐ Retail Store
23. ☐ Friend
24. ☐ Single Copy Mail Order
25. ☐ Other

Please rate the articles in this issue for interest and helpfulness using the key on page 67.

1	2	3	4	5	6	7	8	9	10	
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Excellent
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Good
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fair
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Poor
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Didn't Read

Comments: _____

_____

66a1

Reader Service Card
September-October 1984

Expires December 15, 1984

Name _____

Address _____

_____

City _____ State _____ Zip _____

For further information from specific advertisers, refer to index on page 66 and circle numbers below.

100	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177	178	179
180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228	229
230	231	232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247	248	249

Please check *only* one box for each of the following questions.

Which operating system(s) do you use?

1. ☐ HDOS, Z-DOS and CP/M
2. ☐ HDOS and CP/M
3. ☐ Z-DOS and CP/M
4. ☐ HDOS and Z-DOS
5. ☐ HDOS only
6. ☐ Z-DOS only
7. ☐ CP/M only
8. ☐ MS-DOS only
9. ☐ MS-DOS and CP/M

What is your principal occupation?

K. ☐ Engineer/Scientist
L. ☐ Business Owner/Manager
M. ☐ Military
N. ☐ Programmer/Analyst
O. ☐ Educator
P. ☐ Technician
Q. ☐ Professional
R. ☐ Student
S. ☐ Government
T. ☐ Other

How did you obtain this copy of *Sextant*?

21. ☐ Subscription
22. ☐ Retail Store
23. ☐ Friend
24. ☐ Single Copy Mail Order
25. ☐ Other

Please rate the articles in this issue for interest and helpfulness using the key on page 67.

1	2	3	4	5	6	7	8	9	10	
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Excellent
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Good
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fair
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Poor
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Didn't Read

Comments: _____

_____

66a2

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA.

POSTAGE WILL BE PAID BY ADDRESSEE

Sextant Reader Service
P.O. Box 13558
Philadelphia, PA 19101

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA.

POSTAGE WILL BE PAID BY ADDRESSEE

Sextant Reader Service
P.O. Box 13558
Philadelphia, PA 19101

space on all even passes. On odd passes, D$ is made a null string (a string with zero characters).

Line 80: On every third pass, C6$=" y". During all others, C6$="x ". (Note: two spaces before the y, three spaces after the x.) This will cause the oars (graphic representation of "x" and "y") to be pulled back and forth through the water. The reach will be during every third pass; and the pull during the next two.

Line 90: During the eighteenth and subsequent passes, the oars will be permitted to drag in the water. The distance between the passengers is decreased by one space on the eighteenth pass. So our rower is going toward the rear of the boat.

Line 100: J$ is made to equal D$+E$. This will be two spaces during the pull of the oars (line 70) and one space at other times. This space string is added to the front of the "people string" (A$), the "canoe string" (B$), and the "oar string" (C$). Therefore, each of the three strings become longer with each pass. This will place that particular string farther across the screen to simulate movement of the canoe.

Line 110: After the 24th pass, the "people string" no longer shows the occupants of the canoe.

Line 120: Here we print the strings that we have built and changed during each pass. Direct cursor addressing (Y$) is used along with the next two characters in quotes for placement. The three strings—"people," "canoe," and "oar"—are printed.

Line 130: Here a variable delay is created based on the pass number. On the first pass, the delay is minimal. But as the canoe nears the center of the lake, the rowing becomes increasingly slower. The NEXT I sends us back to line 70 to start another pass.

Line 140: After all graphics action ceases, a title is placed at the bottom of the picture in reverse video and the program awaits any input from the keyboard. Upon receiving any keystroke, there is a RESET of all variables, terminal parameters are restored, and the program ends.

Please refer to the key to the right when completing the article evaluation form on the attached Reader Service Card above. By letting us know how interesting and/or helpful you found each feature in this issue of *Sextant*, you will help us choose the best articles for you in the future.

1. Ray Albrektson, **You Can Take It With You: Your Computer in a Low-Tech Environment**, p. 11
2. Alan K. Gideon, **Dual Speed on Your '89**, p. 17
3. Robert L. Schlessman, **BASIC Grocery Shopping**, p. 23
4. Brian and Christine Ence, **Forth Goes Heath/Zenith**, p. 27
5. Frederick Zimmerman, **Communing by Computer**, p. 41
6. Wayne Rash, Jr., **1-2-3 for the '110/120**, p. 47
7. William Tavolga, **Introduction to Pascal: Part 2**, p. 57
8. Raymond Dotson, **A Canoe Ride in MBASIC**, p. 65
9. Frederick Zimmerman, **Z-DOS Communications Roundup**, p. 69
10. **Index to *Sextant* #1–#12**, p. 78

EDUCATIONAL-UTILITY
HDOS CP/M CP/M-85 ZDOS

SUPERMATH1 - Computer Aided Math Instruction

Provides educational math instruction for grades 1 to 6. For home or school use. Features simple and long decimal addition, subtraction, addition, multiplication and division, regular multiplication and division, and subtraction, multiplication runs under MBASIC.
(Specify HDOS or CP/M) $39.95
Also available for ZDOS under ZBASIC. Above features plus carrying and borrowing, lowest common denominator, reduction of fractions to lowest terms, color or monochrome operation.
(ZDOS) $49.95

HFORTH-79/HFORTH-79 PLUS - An expanded FORTH-79

HFORTH-79 is based on figFORTH Ver 1.1 and includes the full FORTH-79 standard. Runs under the operating system file structure and uses named files for both program and data disk I/O. Includes a full screen editor, an 8080 assembler and high level constructs. (Specify CP/M, CP/M-85 or HDOS) $34.95
HFORTH-79 PLUS adds floating point math set including 24 trig functions, log and exponetiation, fixed and floating conversions and degree and radian conversion. Also string operations including string and array variables, string comparisons, concatinations and conversions and string input/output operations. (Specify CP/M, CP/M-85 or HDOS) $45.95

PRINTER DRIVERS FOR HDOS

Each HDOS driver listed below contains many user selectable feaures and eight combinations can be stored at one time. This allows you to change printer formats without having to reconfigure the driver each time. HDOS drivers are also available with built-in spoolers that allow you to print a file while you are using the computer for something else (for example running BASIC).
UD.DVD - A Universal Driver for printers. Operates with virtually any printer through its settable handshaking and format options. Seventeen options settings are available.
H25.DVD - A driver for the H/Z-25 printer. Fifteen option settings plus superscripts, subscripts and double width, underlined and overprinted text.
MX.DVD - A driver for the Epson MX and RX printers. Fifteen option setting plus double width, emphasized, underlined italic, and overprinted characters.
(Each version for HDOS $29.95
(Each version with spooler for HDOS $39.95

UD.COM - A Universal Printer Driver for CP/M

This is a printer driver/spooler that increases the printing capability of CP/M 2.2.xx. UD.COM has capabilities similar to UD.DVD and contains a built-in spooler that queues up to four files with multiple copies and opional titles and page numbering. (Specify CP/M or CP/M-85) $39.95

SUPER SYSMOD2 - An HDOS Enhancement Program

This program modifies HDOS 2.0 to provide an expanded set of new commands and abbreviate many of the old ones. For example, MOUNT SY1: becomes M1, DISMOUNT SY1: becomes D1. New commands are added to print files, print the disk directory, change the disk label, create batch processing commands, enable the terminal scroll mode, copy files that contain hard read errors and show the free disk space. In addition, the disk directory is alphabetic, file dates remain unchanged when files are copied and a new date switch is added. Also included is a powerful file manager command which presents disk files one at a time and gives you a choice from 12 options to perform on the file. These include changing flags, viewing the first 24 lines, deleting and copying files and others. (HDOS) $29.95

FRENCH, GERMAN, SPANISH and ITALIAN HANGMAN

Programs to help you build a basic working vocabulary in a foreign language. Each contains over 2000 words with their common English translations. Play the traditional game of Hangman or have the words presented in the Flashcard manner. Extensive use is made of the graphic capabilities of the terminal. All foreign words (including accent marks) are done in graphics as is the 'hanging man' himself. (Specify language and for HDOS, CP/M or CP/M-85) ... $29.95

DISAS - A Powerful Disassembler

This is a dissasembler program that generated source code suitable as input to an assembler. It provides a convenient way to find out how programs work and even allows you to modify them. This program expands text and decodes operating system calls. It also inserts LABEL references (in numerical sequence) into the source code so that object files can easily be understood and relocated. (Specify HDOS, CP/M or CP/M-85) $25.00

The above products are available at most HEATHKIT stores or directly from SoftShop. Mail orders are sent postpaid by First Class Mail. Overseas orders add $3.00. Payment must be in U.S. funds. **Telephone orders are accepted.**

35 Shadow Oak Drive
Sudbury, MA 01776
(617)443-9693

SoftShop

Circle #162 on Reader Service Card

CPA II

GREATLY EXPANDED RELEASE OF OUR POPULAR PERSONAL ACCOUNTING SYSTEM

* Any number of Checking Accounts, Vendor and Cash Accounts. Automatic reporting of accounts due. Automatic posting to Vendor accounts.
* Issue checks with up to 5 separate categories and/or tax flags per check. Print your checks with automatic addressing and memo line. Automatic checkbook reconciliation.
* Track Income & Expenses for up to 35 categories each, Expenses vs. Budget, tax deductions, etc.
* Screen or line-printer Bar-Graphs of monthly Actual vs. Budget for the year. Generate Income Statement, spreadsheets, a wide range of other reports. Can be used with any printer.
* New, detailed 100 page manual, all system disks, custom check materials and registration for system updates.
* For systems with 64K RAM; 2 or more disk drives; specify disk format. Send for detailed brochure.

MBASIC under CP/M or ZDOS - $85.00 Postpaid

R-D-S REICHERT DIGITAL SYSTEMS
29 BLAZIER RD. WARREN, N.J. 07060 (201) 469-3854

Circle #151 on Reader Service Card

Z100*
CP/M PLUS
is now available.

For further information, please contact:

Barry Watzman
560 Sunset Rd.
Benton Harbor, MI 49022
616/925-3136

*Z100/110/120: not for Z150/160 series.
CP/M Plus is a trademark of Digital Research.

Circle #206 on Reader Service Card

Z-DOS Communications Roundup

Modem programs running under the Zenith Disk Operating System can be as simple or as complex as you need.

Frederick Zimmerman

This article is intended to give Z110/120 users an overview of the communications software available for the Zenith Disk Operating System (Z-DOS). Of course, there is also some excellent CP/M communications software available for the Z110/120 (for example, Software Wizardry's ZLYNK II). But many Z-DOS users would like to be able to run a communications program without having to reboot from another operating system.

Survey procedure

Early this spring, *Sextant* began writing to companies listed in *The 1983 Buss Directory* as having Z-DOS communications software products. We also put a notice in *Buss: The Independent Newsletter of Heath Co. Computers*. We'd like to thank all the suppliers who sent us copies of their programs, as well as the several *Buss* readers who came up with tips. In addition, Ken Patrick helped out in the early stages of gathering software.

Once we'd received the software, I read the documentation for each program. Then I tried out each program on our Z110, using a Bizcomp 110/300-baud modem and a Racal-Vadic 300/1200-baud modem. Since my time with each program was necessarily limited to a few hours at most, I did not have a chance to evaluate them fully. I did, however, form some impressions of each program, and I'll pass those along to you. But you should be advised that my knowledge of telecommunications is based on experience measured in months rather than years.

I *have* had the advantage of looking at almost all the available Z-DOS communications packages. I've tried to put my remarks into more or less the same format as I would use when describing a program to a friend. I describe a few *Noteworthy features*, mention anything significant I've noticed about *Performance* or *Ease of use*, and then add any *Other comments* I may have. So you shouldn't treat my remarks as definitive evaluations; think of them instead as a starting point in your effort to gather information about Z-DOS communications software.

Standard features

Unless stated otherwise, all the communications programs listed here share a core of common features which can be used to set up telecommunications with remote computer systems. For example, I tested the programs by calling numerous local computer bulletin boards, as well as a national time-sharing computer network, CompuServe, and the University of Michigan's main computer system, MTS (via Telenet).

Unfortunately, there is no one standard method by which information is transmitted between computers, so communications programs must be able to adapt to a number of different methods. All of the programs described here can modify various *communications parameters* which define the way information is to be transmitted (baud rate, number of stop bits, parity, handshaking protocol, etc.).

Communicating with another computer wouldn't be much use if you had no means of copying the information you receive, so each communications program has some provision for what's called *file capture*. That is, the programs can take information as it comes from the remote computer system to your terminal screen, and send that information to a disk file. After you cease communications, you can use your computer to examine and manipulate the information in the disk file.

Similarly, telecommunications is less expensive and more enjoyable when you minimize the amount of keyboarding you do when you're on-line. So each of these communications programs can *transmit files* as well as receive.

Autodial features

Some of the Z-DOS communications programs (ACCESS, AMCALL, MTERM, and PC/InterComm) have an *autodial* capability. Telecommunication requires a telephone connection, which requires dialing the phone. Dialing a phone is exactly the sort of repetitive, error-prone manual chore which experienced computer users learn to regard as anathema. Wouldn't it be better to remove errors of human coordination and memory from the system as much as possible? And wouldn't it be more fun to hit just one key on the computer keyboard than to hunt for seven or more tiny little phone buttons?

An autodial feature enables you to tell the program, usually with just one keystroke, to tell the modem to dial the phone and make the connection for you. However, you need to have an autodial modem, and your communications program needs to "know about" that particular type of modem, so it can send the correct signals to the modem. If you buy a "non-standard" modem, you may find that you can't use your communications program's autodial feature.

Another common feature is the ability to *echo* information from the screen to a printer.

In addition, most programs have some ability to *save selectively* to disk. They accomplish this by enabling you either to save information a screenful at a time or to edit the information before it is saved to disk.

Z-DOS communications programs

ACCESS with Autopilot
$49.95; Hilgraeve, Inc.
Noteworthy features: ACCESS's "Submit" function enables the user to go off-line during a telecommunications session, run a Z-DOS program (such as a text editor or a spreadsheet), and then return to ACCESS, still on-line.

The way "Submit" works is rather interesting. To start up ACCESS you run a batch file called ACCESS.BAT, which invokes ACCESS2.EXE, the "real" ACCESS program. Thus ACCESS2.EXE is running nested within the Z-DOS batch file. When you use the Submit function, ACCESS tells Z-DOS to execute your Submit command and then restart ACCESS. After you've run your applications program, Z-DOS still considers that the batch file ACCESS.BAT is running, and looks for the next batch command—which is to restart ACCESS in the same configuration as it was in when you left it.

Another unusual and important ACCESS feature is the "Autopilot," a macro language called AP. A macro

language is a sort of programming language *within* an applications program. The program user can write macros—ACCESS calls them "scripts"—composed of commands from the macro language. The macro commands are oriented towards a particular function, such as data base management, text editing, or telecommunications.

I use a Z-DOS word processor, WatchWord, which has its own macro language. And my experience with WatchWord's macro capabilities has convinced me that it is difficult to overstate how useful a macro language can be, especially to a knowledgeable computer user.

In the case of ACCESS, the macro language can be used to cause the program to independently perform complicated sequences of tasks. For example, you could write a macro which would cause the program to log on to a remote computer system, transfer files to and from such a system, and then log off. And you can write such macros to be performed at a given time (such as late at night when phone rates are lower).
Ease of use: ACCESS is a complex program, but not intimidatingly so.
Documentation: 37 pages. The manual is organized into chapters which correspond to the menu structure of the program. I found this organizational scheme very helpful.

I also noted that the manual is well written; the style is conversational and clear without being cute or superficial.
Other comments: ACCESS with Autopilot is available in CP/M versions for the H/Z89 and H/Z110/120, and Hilgraeve says an MS-DOS version for the H/Z150 and H/Z160 will be forthcoming.

AMCALL/MCALL-II
$125; MicroCALL Services
Noteworthy features: With MCALL-II, it's possible to "Zip" to Z-DOS, run a program there, and then return to on-line communications. This powerful feature is similar to the "Submit" facility in Hilgraeve, Inc.'s ACCESS program.

One unusual aspect of MCALL-II's design is that it is possible to set as many as eight different "switches" when invoking the program from the Z-DOS command line. For example, typing "MCALL-OWR.1200" at the Z-DOS "A:" prompt would start the MCALL program in Originate mode, with the Western Union TWX protocol, ready to Receive a file at 1200 baud.

The program user can write macros—ACCESS calls them "scripts"—composed of commands from the macro language.

Of course, if you don't want to "crowd" your command line, you needn't; you can just make the appropriate menu choices from within the program. However, setting the switches at the same time as the program is invoked makes for increased convenience, because it's easy to do all your typing in a one-line burst.

The extensive use of command line parameters is an example of the relatively "hackerish" feel of the MCALL-II program and its documentation. I hasten to add that I do not by any means use "hackerish" as a derogatory phrase. What I mean to indicate is that MCALL-II is likely to be most comfortable for users with some technical bent. The program had its origins in a *Dr. Dobb's Journal* article in 1978, when microcomputing was more for hobbyists and less for big businesses, and it still retains something of the aura of those early days.

The user who is more likely to enjoy typing something like "MCALL-OWR.1200" is more likely to feel comfortable with MCALL than is the typical business computer user. But this is more a matter of tone than of content.
Performance: I encountered no glitches or inexplicable malfunctions while using MCALL-II.
Ease of use: One annoyance is that MCALL-II's menu does not "pop up" and then disappear gracefully on command. The MCALL-II menu inserts itself in the middle of whatever text happens to be scrolling by. Unfortunately, that makes it possible for important information to be bumped off the top of the screen.
Documentation: 69 pages.
Other comments: MicroCALL Services offers three programs: MCALL, MCALL-II, and AMCALL (Auto MCALL). MCALL-II is the successor to MCALL, which was a CP/M program first released in April 1979. AMCALL is a version of MCALL-II written to take advantage of the Hayes Smartmodem's autodial capabilities. Since we have Bizcomp (110/300 baud) and Vadic (300/1200 baud) modems, but no Hayes modems, we reviewed a copy of MCALL-II rather than AMCALL.

I found one pleasant surprise when I used MCALL-II's Originate menu: a list of phone numbers for several computer bulletin boards in the Washington, D.C., area. (MicroCALL Services is based in Laurel, Maryland.)

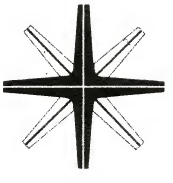
Cyterm
$120; Iowa State University
Noteworthy features: The documentation states that Cyterm will enable a Z110/120 to "operate as a terminal with WYLBUR [a popular mainframe text-editing program] on the NAS AS/6 computer, VAX/VMS on the VAX 11/780 computer, or many other host computers." If your organization has a VAX from Digital Equipment Corporation or an AS/6-type mainframe, you might find Cyterm especially appropriate for your needs. Of course, the program can also be used for general-purpose telecommunications work.
Performance: Everything seemed to be working all right the first few times I ran Cyterm—the program's menu appeared on the screen, I chose the appropriate options, and got set to telecommunicate. But somehow the program wasn't talking to the modem. After a phone call to Doug Jacobsen at Iowa State, I understood the problem: Cyterm was assuming that I was using serial port J1 to connect my modem to the computer. Most communications programs assume

LEATHERETTE DUST COVERS

High quality leatherette dust covers are available for the H/Z89/90/19, H/Z25, H17, H14, H9, H8, etc. at $12.95 each plus $2.50 for shipping/handling. Custom dust covers can be manfactured if you will provide a diagram with dimensions (please add a $5 design fee). Sample of the material is available on request (at no charge).

TAPE BASIC CONVERSION TO DISK

BASCONV is a utility program which will convert Heath's tape Extended BASIC programs to a CPM disk file quickly and easily without having to retype the entire program. Just enter the information requested by BASCONV and the conversion work is done without having to worry about typing errors. BASCONV requires CPM (80) and the cassette board for the H8 or H/Z89. The cost is only $25 (include $1.50 for shipping/handling) and is available in HS or SS (48 tpi) formats.



Send check or money order (no CODs or charges) to KCSS (KANDUEAZY COMPUTER SOFTWARE SERVICES), 6218 BLOSSOM LANE, ALEXANDRIA, VA 22310 (703) 922-9450

ALL ZENITH DATA SYSTEMS PRODUCTS AT 10-25% DISCOUNT. FREE CATALOGUE

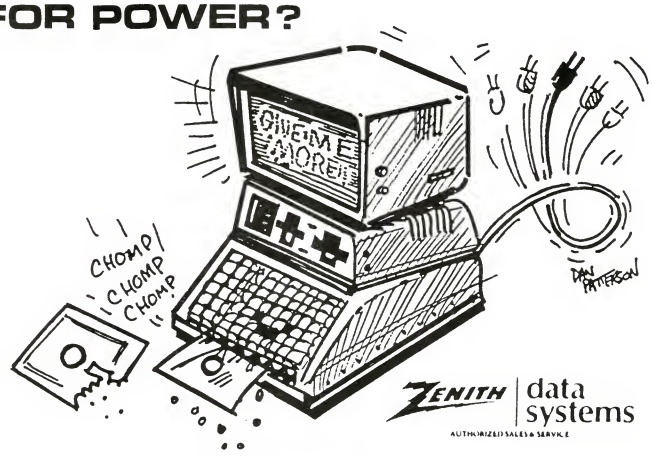
Circle #141 on Reader Service Card

DOES YOUR ZENITH LUST FOR POWER?

Zenith compatible RAM chips for only 6.95 per chip! That's a mere $56 for a 64K bank of video RAM chips, or $63 to upgrade the Z100 to 192K RAM, or for a 64K bank upgrade for the Z-150/160.

Fully guaranteed, these are top quality chips carefully chosen for reliability and compatability. In the unlikely event you receive a bad chip, we'll happily replace it any time within 90 days of purchase.

So satisfy your Zenith's lust for power — give it the ability to go CRUNCH!!



First Capitol Computer

Available direct from First Capitol Computer. Please add $2 minimum (or 2%, whichever is greater) for shipping and handling. If shipped to a Missouri address, please add appropriate sales tax.

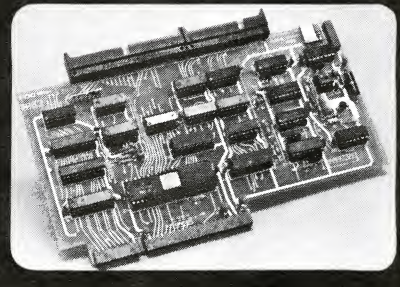
First Capitol Computer is a division of Software Wizardry, Inc.

1106 First Capitol Drive St. Charles, MO 63301 (314) 946-1968

First Capitol has over 500 items of interest to Heath/Zenith users, including all Software Wizardry products. Please request our free full line catalog.

Circle #221 on Reader Service Card

1 CONTROLLER FOR 8" & 5.25" DRIVES



Now be able to run standard 8" Shugart compatible drives and 5.25" drives (including the H37 type) in double and single density, automatically with one controller.

Your hard sectored 5.25" disks can be reformatted and used as soft sectored double density disks. The FDC-880H operates with or without the Heath hard sectored controller.

PRICED AT $395

Includes controller board CP/M boot prom, I/O decoder prom, hardware/software manuals BIOS source listing. HDOS driver now available for $50.00.

5-20 day delivery–pay by check, C.O.D., Visa, or M/C.

Contact:
C.D.R. Systems Inc.
7210 Clairemont Mesa Blvd.
San Diego, CA 92111
Tel. (619) 560-1272

Circle #109 on Reader Service Card

The ILLUSTRATOR

The **ILLUSTRATOR** is a full-featured graphics drawing program for use with the Z-100 pixel graphics (w/wo color) or the H89/H19 IMAGINATOR pixel graphics option. No need for a lightpen.

Features Include:

- Turtle Graphics
- Rubber Banding
- Line Drawing
- Box Drawing
- Circle Drawing
- Ellipse Drawing
- Diamond Drawing
- Screen Print
- Dot Cursor Control
- Area Fill
- Box Fill
- Circle Fill
- Diamond Fill
- Copy Area
- Erase Area
- Text Mode
- Invert Mode
- Help Display
- 64 Colors
- Color Define
- Color Pattern
- Screen Save
- Screen Restore
- Area Save
- Area Restore
- Compacted Files
- more. . .

ONLY $89.95!

HDOS version for H89, H8, requires IMAGINATOR
ZDOS version for Z-100, color memory optional
Supports many dot graphics printers. Call for info.

NEWLINE SOFTWARE
P.O. Box 289 • Tiverton RI 02878 (401) 624–3322

NAME _____
STREET _____
CITY _____
STATE _____ ZIP _____

CHECK ONE
☐ H89, H8/H19, HDOS
☐ Z-100, ZDOS

Send me _____ "The ILLUSTRATOR" program(s) at $89.95 each.
Check one: ☐ payment enclosed ☐ send COD (add $4.00)
Send order to:
NEWLINE SOFTWARE, P.O. BOX 289, TIVERTON RI 02878
Foreign orders: add $3.00 Airmail, $10.00 for non-U.S. checks

HDOS is a trademark of Heath Company
ZDOS, Z-100 are trademarks of Zenith Data Systems, Inc.
IMAGINATOR is a trademark of Cleveland Codonics, Inc.

Circle #145 on Reader Service Card

that you are using port J2, so my modem cable was hooked up there. Unfortunately, the interim documentation I saw for Cyterm didn't mention anything about which port to choose.

When I ran Cyterm on our Z110 with only 128K of RAM, the program crashed, telling me 'stack overflow' followed by a bunch of incomprehensible error codes. Jacobsen told me that apparently the program will not run on a Z110/120 with only 128K RAM. (All the Z110/120s at Iowa State have 192K RAM.) I hope this will be mentioned in the final version of the documentation.

Ease of use: The menu is easy to understand, and there is an on-line HELP facility.

Documentation: 7 pages (interim version).

Other comments: The version of Cyterm which I received had three menu options which the programmers had not yet implemented: "create a text file," "print a text file," and "disk operating system commands." When he sent us the program in mid-April, Kevin Gamble, Iowa State University's Manager of Software Distribution, told me that "the final version of the program and documentation is scheduled for completion by the first of May."

The disk I received was marked for the "Zenith Z-100," but I couldn't do a Z-DOS DIRectory on it in our Z110. After a bit of thought, I put the disk in our Z150. Lo and behold, the MS-DOS 2 DIRectory command worked fine, confirming my suspicion that I had been sent a 9-sector/track, MS-DOS 2.0-formatted disk.

So I transferred the files to an 8-sector/track, Z-DOS 1.1-formatted disk, and ran the program on the Z110. When I talked to Iowa State, they told me they had corrected the problem and in the future will send only 8-sector/track disks to Z110/120 users.

'C' COMPILER
AN OUTSTANDING VALUE
"We bought and evaluated over $1500.00 worth of 'C' compilers... C/80 is the one we use."
Dr. Bruce E. Wampler, Aspen Software
author of "Grammatik"
C/80 Full featured C Compiler for CP/M with I/O redirection, command expansion, execution trace and profile, initializers, Macro-80 compatibility, ROMable code.
49.95
C/80 FLOATS & LONGS Adds 32 bit data types to C/80 3.0 compiler. Includes I/O and transcendental function library.
29.95
FREE CATALOG Call or write for 16 page booklet detailing our programming languages LISP/80, RATFOR, Assemblers, and 25 other CP/M products.
The Software Toolworks
15233 Ventura Blvd., #1118
Sherman Oaks, CA 91403
(213) 986-4885
Dealer inquiries invited
Circle #165 on Reader Service Card

The Micro Link II
$99; Digital Marketing

Noteworthy features: Perhaps the most unusual aspect of this program's design is its command structure. The program's functions are divided into several menus, which is normal enough; but choosing from those menus is a disconcerting process.

The Micro Link II is the only program I've ever seen which presents you with a list of choices identified by numbers from 1 to 50. But not *every* number from 1 to 50; there are some gaps, presumably because some of the "left out" numbers represent menu items which have not yet been implemented or which existed in previous versions of the program. The large number of possible choices, and the absence of mnemonic clues, makes this program unnecessarily difficult to learn. It's one thing to remember that the menu item you want is "X" for "eXit", or number "6" of choices 1 through 6, or letter "F" of choices A through F. It's more difficult to remember that The Micro Link II's exit command is "15".

The authors of the documentation for this program appear to be blithely unaware of the potential for confusion. Early on in the manual, they give an example of how you might send a letter to an electronic mail system.

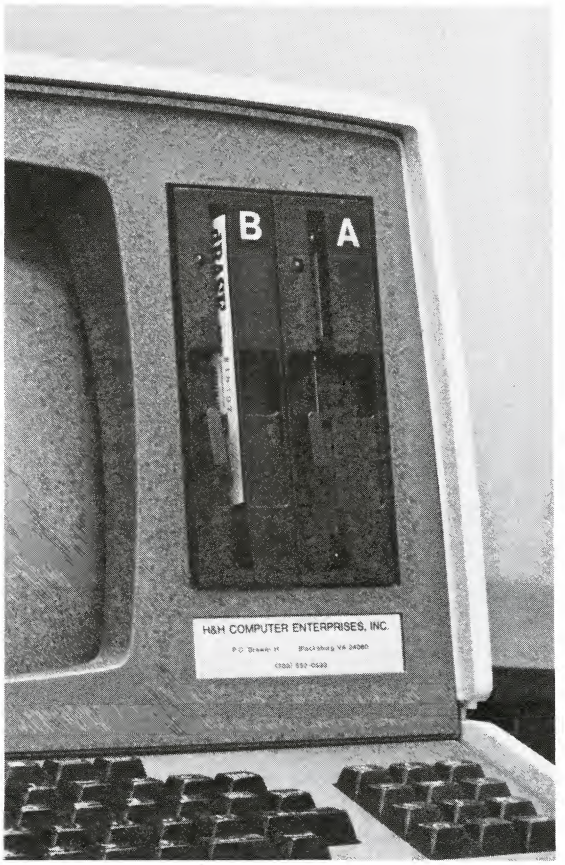
22.39
41
43 (on)
44.1
Check line prompt character.
File must have or be formatted into lines.
45.0D
5
All file options set?(Y/N)**Y**
File? **TOJOHN.DOC**
Send now? (Y/N):**N**

When the documentation explains that command "22.39" sets the line width to 39, and "41.1" chooses option 1 of the Edit Outgoing File command, and so forth, the reader realizes that actually the system is internally consistent. But after seeing "22.39 / 41.1 / 43 (on) / 44.1 ...," that first moment of fury lingers on.

It may seem a bit fussy to get upset because a program wants you to say "22.39" instead of "WIDTH 39". The distinction is a small one for an experienced computer user, or even someone with a good memory for numbers; but for a novice it could be off-putting in the extreme. And since the command structure is the primary means whereby the user interacts with the program, I think it appropriate to comment about it.

Ease of use: Despite my aversion to The Micro Link's numeric command syntax, I should note that I had little difficulty using the program to log on to a remote computer system and capture some text.

The Micro Link prompts the user for



INCREASE YOUR IN-CABINET STORAGE CAPACITY

With The Original Storage Multiplier Units

Slip out your 125K byte drive and slip in one of our Disk Storage Multiplier units. Our DSM units will increase your floppy storage by at least four times by using high speed, low power, double sided drives. **Each DSM kit is complete with software, labelled drives (fully checked out), all cabling and hardware, and documentation. Your choice of HDOS or Heath's CP/M software is included** software for the other operating system is only $35 extra. Soft sector only operation requires no software. Our idea has been copied, but no one has copied our quality and customer support.
DSM capacities - multiples of the 125K drive.

	DSM 4000	DSM 8000
Hard Sector	4X	8X
with Software	$510	$600
Soft Sector	8X	16X
only	490	570

We pay for shipping in the continental U. S.
External enclosures available.

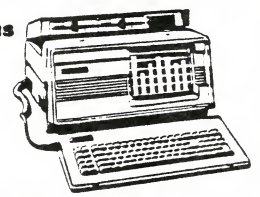
Group purchase discounts available. Shipping is postpaid in the continental U.S. Others please add 5%; excess will be refunded. VA residents please 4% tax.

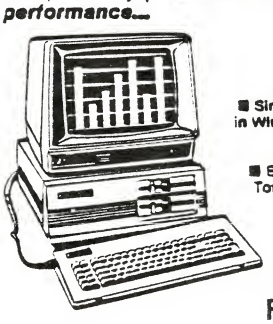
H & H COMPUTER ENTERPRISES, INC.
P.O. Drawer H Blacksburg, VA 24060
(703) 552-0599

Circle #126 on Reader Service Card

Go Beyond COMPATIBILITY . . . Reach For TOTAL PERFORMANCE!

Profit **from Zenith Data Systems Z-150 PC desktop or Z-160 PC portable capabilities beginning with 16-bit *IBM compatibility* plus *Zenith total performance...***





- 128K Memory, 640K Expandability
- Single/Dual 5¼" Disk Drives
- 10.6MB Built-in Winchester Drive*
- 4 Open Expansion Slots
- Full Color*, Green*, or Amber Video
- Clearly Labeled, Easy-to-Use Keyboard
- Excellent Price/Performance Ratio
- Zenith Total Service, Technical and Training Support

ZENITH | data systems
THE QUALITY GOES IN BEFORE THE NAME GOES ON

FROM ONLY $1799

CALL OR WRITE FOR FREE CATALOG

OMNI DATA SYSTEMS INC.

35 Park Street
ATTLEBORO, MA 02703
1 (617) 222-0425

MasterCard VISA

Circle #201 on Reader Service Card

LEARN TO PROGRAM H89/H19 GRAPHICS IN MBASIC

BASIC GRAPHICS PRIMER is a computer based course that will teach you fundamental MBASIC programming techniques to control the H19 terminal or H89 computer graphics. Seven lessons will teach you many forms of graphic plots, data plotting, multiple sequential and random access files used for graphics, basic figure animation techniques, and simple computer graphics game design. Each lesson consists of simple illustrative program segments with complete explanations of the programming techniques involved, questions to reinforce the lesson material, and one or more example programs. Most H19/H89 terminal commands are covered in the lessons, including use of the special function keys. **BASIC GRAPHICS PRIMER** is a "HOW TO" course with plenty of examples. If you want to learn how to take full advantage of the H19/H89 graphics features in your programs, **BASIC GRAPHICS PRIMER** is a must. For CP/M only. Requires a printer.

ONLY $49.95!

CP/M version for H89, H8, H19 requires CP/M and MBASIC

Newline Software

P.O. Box 289 • Tiverton RI 02878 (401) 624–3322

NAME _____
STREET _____
CITY _____
STATE _____ ZIP _____

Send me ____ BASIC GRAPHICS PRIMER program(s) forCP/M at $49.95 each.

Check one: ☐ payment enclosed ☐ send COD (add $3.00)
Send order to:
NEWLINE SOFTWARE, P.O. BOX 289, TIVERTON RI 02878
Foreign orders: add $3.00 Airmail, $10.00 for non-U.S. checks

CP/M is a trademark of Digital Research, Inc.
MBASIC is a trademark of Microsoft, Inc.

Circle #145 on Reader Service Card

a command with a colon ":". Unfortunately, when you give the program commands, the only acknowledgement you ever receive is another ":" prompt.

Also, when you get into one of the secondary menus, such as the "File and misc. commands" menu, there is nothing on the screen to indicate how to get back to the main menu. I was able to remember that "6.1" was the command to bring me back to the main menu, but I have an unusually good memory for numbers.

Documentation: 88 pages, with a glossary and a chart of ASCII codes.

Other comments: CP/M and CP/M-86 versions are available.

MTERM

$79.95; Micro-Systems Software, Inc.

Noteworthy features: One rather unusual feature, which will be of interest mostly to expert users, is MTERM's "change/examine tables" command. The program can display three 8 row x 16 column (0-7 x 0-F hexadecimal) tables. These tables show the correspondences between the characters the user types at the keyboard and the characters the program sends to the printer, the video display, the memory buffer, or the remote computer. Most of the time, there is an exact correspondence—the letter "Z" whose code in the standard ASCII set is "5A" is sent as "5A". But sometimes it is desirable or necessary to "filter" a character, because of the peculiarities of your program, your terminal, or your printer. For example, the ASCII character "07" (CTRL-G) is usually used to mean "ring the bell." Let's say you want to prevent your printer from receiving any "07" characters. MTERM enables you to change the appropriate translation table so that "07" corresponds to "00," the ASCII null character.

Performance: MTERM's 32 kilobyte capture buffer fills up rapidly at 1200 baud. Since we have almost a megabyte of memory in our Z110 (thanks to a Macrotech memory board), I often wished there was some way to expand the size of the capture buffer.

Of the programs I tested, MTERM gave me the most reliably trouble-free results. Whenever I had difficulties establishing a connection with a remote system, MTERM was the program I ran in order to make sure that the problem wasn't in the communications software.

Ease of use: Of all the communications programs I tried out, MTERM was the easiest to learn. Moreover, the program is "expertise-independent." That is to say, the amount of time required to learn MTERM should be about the same for any computer user, from novice to expert. With most programs, there's a sort of hierarchy of complexity—it's possible to scratch the surface pretty quickly, but mastering the program's full capabilities can take a lot of time. But with MTERM, there's really only one level of complexity. That's why MTERM is a good choice for a novice. But MTERM's simplicity also makes it a good choice for a knowledgeable user who just wants to get a "plain vanilla" telecommunications program up and running.

Documentation: 132 pages. As with Hilgraeve, Inc.'s ACCESS, the structure of the manual corresponds to the structure of the program, making it easy to browse.

There is a Technical Manual at the end of the User's Manual, providing information about the internal structure of MTERM.

Other comments: A separate file-transfer utility program, XFER, is also included with MTERM.

Make sure your second terminal has graphics capabilities appropriate for the programs you want to run.

PC/InterComm

$99; Mark of the Unicorn

Noteworthy features: This program is designed to enable the Z110/120 to emulate a specific type of "intelligent" terminal: the Digital Equipment Corporation VT102. The program recognizes and processes all the same control sequences as the VT102 terminal. Thus, you can use your Z110/120 as a terminal with large computer systems which can control VT102, VT100, or VT52 terminals.

The program uses some of the Z110/120's special function keys to emulate some of the special function keys on the VT102. The Z110's remaining special function keys perform useful functions such as saving the screen to a file (F11) or toggling the printer on and off (D CHR). Also, SHIFT-F0 through SHIFT-F12 are user-definable "macro" keys, which can be used to send any string of ASCII characters (up to 23 characters long) just as if you had typed them.

Performance: When I finished testing all the Z-DOS communications programs, I installed PC/InterComm on my main Z-DOS system disk. It's well suited for *Sextant*'s primary telecommunications activity, which is capturing large amounts of text from remote computer systems such as CompuServe. With PC/InterComm, I was able to capture a 153K file to disk—that represents close to an hour of 1200-baud operation, which is as much time as we ever spend in any one telecommunications session.

I should mention that the program did mysteriously freeze up a couple of times, right after I told PC/InterComm to start collecting text into a capture file at 1200 baud. But the problem did not recur as long as I started collecting text at the beginning of a work session. Mark of the Unicorn says that this was indeed a bug in the program, and that it has now been fixed.

Ease of use: I felt that PC/InterComm presented itself to the user in a more esthetically appealing way than any of the other programs I tested. In Computer Magazinese, I'd say that its "user interface" is very "professional-looking." I'm wary of drawing distinctions between functionally similar programs on the basis of such largely stylistic, and arguably arbitrary, matters as the location of text on the screen, the phrasing of menu options, etc. But I found it unavoidable. I did draw such distinctions; I report them here with the caveat that such matters are heavily subjective.

Documentation: 77 pages, with a glossary. I was pleased to see that the appendix on "Troubleshooting" gives "intuitive" advice which might actually be helpful to the novice. Far too many manuals give trouble-shooting advice only in the form of technical gobbledygook which is only useful if you already know how to solve the problem. The PC/InterComm manual offered the following intuitively sound advice on how to solve cable and connector problems: "If you ever get confused, just stop and think for a second about the two pieces of equipment that you are hooking together—'*This* one thinks it's a terminal, and the *other* one does too, so we need a reversal of some sort.'"

Other comments: This program is also available for the Z150.

Pro Driver

$49; Studio Computers, Inc.

Noteworthy features: Pro Driver has a Reporter function which you can use to keep a log of your activities. In particular, there's a report-generation facility which you can use to print out records of your connect time organized by date or telephone number. That's useful for checking your bills from time-sharing services.

Performance: While I was testing Pro Driver, we had a defective Macrotech memory board installed in our Z110. I kept encountering "spontaneous resets" while using Pro Driver—the computer would suddenly revert to the Z110 monitor's pointing-hand boot prompt. Initially, Pro Driver was the only program with which this problem occurred, which led me to what now appears the unjustified suspicion that Pro Driver was chiefly responsible for the problem. But the spontaneous resets began occurring with other programs, including our stalwart word processor, WatchWord. We

ran the Z110 monitor's memory test several times, and eventually it detected an intermittent chip failure on the Macrotech board. So we finally removed the Macrotech board. Unfortunately, by the time we took this action, I didn't have much time left to test Pro Driver.

So I should emphasize that once the Macrotech board was removed, Pro Driver behaved quite well. The design of the program is well conceived, and it should be quite effective for normal telecommunications operations.

Ease of use: The configuration program is separate from the standard communications program; this can be a convenience if your disk space is tight.

In the standard program, there is a sub-menu which enables you to change the default communications parameters. At the bottom of the parameter menu, the program tells you to press "F1 to retain defaults." I interpreted that to mean that pressing F1 would change the parameters back to the way they were before I entered the sub-menu. It took me a long, long time to realize that pressing F1 would cause the program to retain the parameters I had just changed—they were the *new* defaults!

Documentation: 205 pages.

Other comments: Copyright 1983, 1984 by LAB Software.

The documentation notes that this version of Pro Driver is written to run with version 1.13 of Z-DOS. As new versions of the operating system are released, Studio Computers will update Pro Driver accordingly, and make the patches available on request.

REMCON Remote Console Facility
$44.95; Husker Systems of Nebraska

Noteworthy features: This program, running on your Z110/120, enables remote users to access and use your computer via modem. REMCON "puts the terminal to sleep" when you first execute it, blanking the screen entirely while the program waits for an incoming phone call. Thus you can leave the computer on overnight without having to worry about the electron beam of your CRT burning the phosphor on the display screen.

You can set the program up so that a password is required to access your system.

The documentation notes that the remote user will not be able to use programs which directly address screen display memory, "since those programs bypass [the Z-DOS] BIOS routines BIOS_STATUS, BIOS_CONIN, BIOS_CONOUT, and BIOS_PRINT." For example, S & K Technology's Z-DOS word processor, WatchWord, will *not* work.

The documentation also notes that you don't *have* to use a modem and a phone line to connect the remote terminal to your Z110. You could also use a cable for a "local direct attachment." For example, you could have one terminal in your study and another in your basement. There's a pin-by-pin account of how to connect the cables.

Performance: I didn't get a chance to test this program from a remote terminal.

Documentation: 20 pages. Clearly written and logically organized, with the information you need to know presented in the order you need to learn it.

Other comments: REMCON is also available with ZED-COMM, as a "Comm-Pak Dual Communications Systems" package, for $79.95.

ZED-COMM Modem Control System
$49.95; Husker Systems of Nebraska, Inc.

Noteworthy features: The manual is organized around a series of questions a new user might logically ask, beginning with "I bought this package! What first?" and going on to the really interesting questions like "How do I know what the modem port settings are?" and "How do I send a file?" This is a clever and helpful approach.

Performance: To enter ZED-COMM's command mode, where you can change communications parameters, etc., you press the F12 special function key. Most unfortunately, however, there is nothing on the ZED-COMM screen to tell you to press F12. Instead, there is a misleading message telling you to press ENTER or RETURN. If you do that, the

IBM-PC/ZENITH Z-100 users.

Expand your computer universe with—

micro/VERSAL ™

A utility program to READ/WRITE over 20 different 5¼ (CPM, CPM/86, MS-DOS & USER DEFINABLE) disk formats. Now you can easily transfer text, data, or programs between many different micro computers by simply loading **micro/VERSAL**™ and the disk you want to READ/WRITE from or to. **micro/VERSAL**™ also includes comprehensive utilities to DUMP any 5¼ disk by track, RDSECT to read disk sectors and FAPP, a program to append files together to produce a large file. For disk formats not directly supported, **micro/VERSAL**™ provides customization routines that allow users to write their own directory routines.

NOW WITH FORMATTING!

micro/VERSAL™ **$79.99**
plus $4.00 shipping & handling

Also **COED**™ full screen editor..... **$34.97**
Includes: Stack arithmatic, MACRO commands, multiple files, definable function keys and much more.

CREDIT CARD ORDERS: Master Charge / VISA
MAIL ORDERS: Checks or money orders. N.J. resident add 6% sales tax.

ADVANCED SOFTWARE TECHNOLOGIES
417 Broad Street
Bloomfield, N.J. 07003
(201) 783-7298

Circle #210 on Reader Service Card

IS YOUR CHECKBOOK A BALANCING ACT?

CHECK PROCESSOR is an easy to learn, easy to use program for balancing your checkbook, savings, and charge card accounts. **CHECK PROCESSOR** also maintains a record of your accounts, and records up to 31 categories of account transactions for tax deduction or accounting purposes. **CHECK PROCESSOR** is designed for easy entry and modification of transaction data, much like a screen oriented text editor. On-screen automatic recalculation provides you with instantaneous balance totals with each deposit/withdrawal or debit/credit. Included with **CHECK PROCESSOR** is **CHECK LIST. CHECK LIST** will print various reports including Reconciled Checks, Current Checks, and Individual Check Categories. Allows multiple files for different accounts.

ONLY $29.95!

CP/M version for H89, H8/H19
ZDOS version for Z-100

NEWLINE SOFTWARE

P.O. Box 289 • Tiverton RI 02878 (401) 624–3322

NAME _____
STREET _____
CITY _____
STATE _____ ZIP _____

CHECK ONE
☐ H89, H8/H19, CP/M
☐ Z-100, ZDOS

Send me _____ CHECK PROCESSOR program(s) at $29.95 each.
Check one: ☐ payment enclosed ☐ send COD (add $3.00)
Send order to:
NEWLINE SOFTWARE, P.O. BOX 289, TIVERTON RI 02878
Foreign orders: add $3.00 Airmail, $10.00 for non-U.S. checks

CP/M is a trademark of Digital Research, Inc.
ZDOS, Z-100 are trademarks of Zenith Data Systems, Inc.

Circle #145 on Reader Service Card

GRAFIT®
POWERFUL, FLEXIBLE XY-PLOTTING

- Points with symbols, smooth curve, function, best-fit nonlinear function, multiple combinations
- Log or linear, variable size, automatic/specified labels
- Plot from disk or enter, save entries
- Regular, intermediate, advanced levels
- Hard copy on popular printers—please specify model

Z100 with Z-BASIC
$50.00 (check or money order)
Illinois residents add 7% tax.

SciMed Analysis
2622 Noyes St.
Evanston, IL 60201
312/328-5687

Circle #245 on Reader Service Card

Improved Graphics for
H19 & H89
(also H19A & H89A)

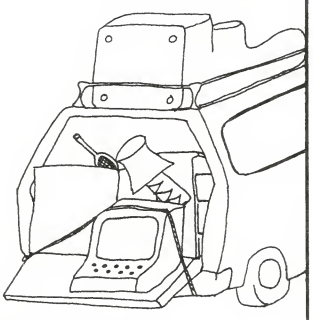
G-Prom is a new character generator that:

- Improves screen graphics resolution 2½ times.
- Improves formation of 23 ASCII characters.
- Is a plug-in replacement for the original C.G. ROM.

Only $19.95 with shipping, documentation, instructions, and demo program listing.

NORCOM
9630 Hayes
Overland Park, KS 66212

Circle #200 on Reader Service Card



MOVING? Don't lose your next issue of Sextant in the shuffle.
Send your Change of Address to:
Sextant
Attn: Circulation Department
716 E Street, S.E.
Washington, DC 20003

program hangs up. Of course, the documentation tells you about F12, but there really should be something on-screen.
Ease of use: In most respects, this is a straightforward, easy-to-learn program.
Documentation: 29 pages.
Other comments: ZED-COMM is also available with another Husker Systems product, REMCON (described above), as a "Comm-Pak Dual Communications Systems" package, for $79.95.

ZT
$25; Codewright (Dale Wilson)
Noteworthy features: This program was first released in October 1982, shortly after Zenith first released the Z110/120. In order to make the program available quickly, simplicity was made a design objective.

I hasten to note that, for many applications, simplicity is a virtue. This is definitely a "bare-bones" communications program. The price is low, it's easy to learn, and it comes from a programmer, Dale Wilson, who is widely respected within the Heath/Zenith community.
Performance: The program worked fine for me at 1200 baud.
Ease of use: One nice feature: if you press the HELP key, the 25th line of the Z110/120 screen will display labels for the special function keys. But if you don't want the special function keys to be enabled—for example, if the program in the other computer is expecting that your computer will have available the H/Z19 function keys—you can use F9 to toggle the function keys off and on.
Documentation: 16 pages.
Other comments: The program is called TERMINAL, which means you have to type eight letters to invoke it; why not something short and easy to type, like ZT? Of course, you can always use Z-DOS's RENAME command to change the filename.

ZSTEM
See *Other comments* for prices; KEA Systems Ltd.
Noteworthy features: This program enables the Z110/120 to emulate the H/Z19 and VT52 terminals (and, optionally, the VT100 and Dasher 200 terminals). KEA Systems has adopted a copy-protection scheme which is unusually fair to the user. To run the program, the user must insert a small module into the lightpen port (J4) at the back of the Z110/120. This means that the user can make unlimited copies of the program for backup or for convenience's sake. But it's not possible for the user to give those program copies away, since anyone else who'd want to run the program would need a KEA Systems module.
Performance: The documentation says that ZSTEM requires version 1.25 of Z-DOS, with version 1.10 of the Z-DOS BIOS. Yet it reported "Unrecognized BIOS" when I tried to boot it with my 3-23-83 version of Z-DOS, which claims to be version 1.25 with the version 1.10 BIOS. There may be something screwy about our 3-23-83 release of Z-DOS, but in any event it would be nice if the program was less sensitive to the version of the operating system.

So we haven't been able to try it out. We do have one item of information about the program which is worth passing on: one ZSTEM user gave us a very favorable report on the program.
Documentation: 35 pages.
Other comments: Prices for ZSTEM begin with the $39.95 hobby version, which "includes VT52 emulation, configuration and save capabilities, and disk transfer capabilities including XMODEM." But the hobby version is limited to 1200 baud maximum, and it can't echo received information to the printer. Nor does it support ZSTEM's "softkey" feature, which enables the user to program almost every key on the Z110/120 keyboard to transmit a string of control and/or text characters. The length of the strings is limited only by available memory.

For $98.95, you can buy ZSTEM as a VT52 emulator with printer support and softkeys.

For $124.95, you can buy ZSTEM with support for the Dasher D100/200/210 terminals.

And for $148.95, you can buy ZSTEM with the capability to emulate the DEC VT100 terminal.

If you want to purchase the documentation separately, it's available for $20.00, which may be credited against a future purchase of the program.

Special category communications programs

Dualport
$39.95; Sunflower Software
Noteworthy features: DUALPORT allows you to use one of your Z110/120's serial ports to connect a second terminal to the computer, using the Z-DOS AUX device.

DUALPORT can echo input and output from the Z110/120, the "host," to a second (or "remote") terminal.

Since *input* can be echoed, the keyboard of a remote terminal (a Z29, for example) can be used to send commands to the host Z110/120.

Since *output* can be echoed, the remote terminal can "shadow" whatever is on the Z110/120 display screen. (Unless the Z110/120 program calls for more sophisticated graphics than the remote terminal can perform.)

DUALPORT uses five commands to control I/O from and to the host and remote devices:

STAR sends both input and output from and to both the host (Z110/120)

and remote devices (Z29, etc.). So you can use either the Z110/120 keyboard or the terminal's keyboard to issue commands to the Z110's central processor unit, and both the Z110/120 and the terminal screen will reflect the results.

RKOF disables input from the remote device, while still sending output to it.

HKOF disables input from the host keyboard, while still sending output to the host display.

HOFF disables all input and output to and from the host terminal.

STOP disables all input and output to and from the remote device.

There is also a HELP command which tells you about the commands described above.

You can, if you wish, choose an eight-letter password which must be entered from the remote terminal before it can access the host computer. This is particularly useful if you are connecting the remote terminal to the host over a phone line, via a modem.

DUALPORT comes configured for serial port A of your Z110/120, but can be reconfigured for serial port B.

Performance: I tested DUALPORT by hooking up our Z29 to our Z110, and everything worked just fine.

I was surprised (although I shouldn't have been) to realize that the display from our word processor, WatchWord, couldn't be echoed on the remote Z29, because the Z29's graphics weren't up to it. Make sure your second terminal has graphics capabilities appropriate for the programs you want to run.

Ease of use: Running the program is very simple.

It would be helpful if the documentation spent a little time explaining why it's necessary to INSTALL a new BIOS and also to CONFIGUR the AUX device. Those are procedures which a novice might find confusing. A novice might also find it worrisome to be "messing with" something as fundamental to the operation of the computer as the BIOS; a few words of reassurance might go a long way here.

Documentation: 6 pages.

Other comments: The first disk I received from Sunflower apparently was defective. When I tried to do a directory, the operating system reported back a "Seek error on drive B:". I called Sunflower, and they sent a replacement disk immediately, which worked perfectly.

You must use the 4-15-83 Z-DOS BIOS with DUALPORT. (The program comes with an INSTALL program which will put the 4-15-83 BIOS on your system disk.)

It's conceivable that the 4-15-83 BIOS might be incompatible with some of your current programs. In general, it's not good practice to mix different versions of an operating system. In particular, Z-DOS utility programs such as FORMAT and PRINT, for example, are sometimes changed between releases of the operating system. So you'd probably be wise to make up a separate Z-DOS system disk for use specifically with DUALPORT.

F-TRANS
$59.95; Generic Software

Noteworthy features: This program enables you to transfer files between CP/M and MS-DOS computers, either over phone lines via modem or via cable for direct connection. Thus, you could use this program to transfer files from CP/M on an H8, H/Z89, or Z110/120 to Z-DOS on a Z110/120 (or to MS-DOS 2.0 on a Z150, for that matter).

Performance: The documentation notes that only CP/M-80 version 2.0 or later is supported, on the 8080, Z80, and 8085 central processor units.

It also notes that F-TRANS is *not* compatible with other file transfer protocols, such as Ward Christensen's MODEM7.

Ease of use: You must configure both computers to the proper baud rate and other communications parameters. Although Zenith Data Systems' CONFIGUR program is very easy to use—as I heard someone say, "it does everything but plug in the cables for you"—novices are still apt to find the procedure somewhat unnerving.

Documentation: 8 pages. Brief documentation is sometimes worrisome—*what* have they forgotten to tell me?—but in this case the worry seems unjustified. The documentation is clear, concise, and complete; it's just that the program is very simple.

PLATO Access Disk
$29.95; Control Data Corporation

Noteworthy features: This program enables you to access the PLATO educational computer network (assuming you are already a subscriber).

Documentation: 9 pages.

Other comments: For information about PLATO, contact a Control Data Corporation sales representative, or call 800/328-1109 (except in Minnesota, Alaska, and Hawaii, where you should call 612/853-7518).

Z3000 Binary Synchronous Communications System
$295; Husker Systems of Nebraska, Inc.

Noteworthy features: This program enables you to transfer batch files from your Z110/120 to an IBM mainframe, using the same protocol as an IBM 3780 batch terminal workstation.

The documentation notes that the Z3000 system can be used for networking Z110s and H/Z89s *without* having an IBM mainframe in the network.

Documentation: 54 pages. The documentation is written in a clear, conversational style, and seems to be unusually candid about design considerations and strategies.

Ordering Information

Control Data Corporation
P.O. Box 261127
San Diego, CA 92126

Digital Marketing
2363 Boulevard Circle
Walnut Creek, CA 94595
800/826-2222 or 415/947-1000

Generic Software
P.O. Box 790
Marquette, MI 49855
906/249-9801

Hilgraeve, Inc.
P.O. Box 941
Monroe, MI 48161
313/243-0576

Husker Systems of Nebraska
6657 Redick Avenue
Omaha, NE 68152
800/835–7427 x277 or
402/572–6290

Iowa State University
Software Distribution
108 Computation Center
Iowa State University
Ames, IA 50011
515/294-8658

KEA Systems
311-811 Beach Avenue
Vancouver, B.C.
Canada V6Z 2B5
604/687-2744

Mark of the Unicorn
222 Third Street
Cambridge, MA 02142
617/576–2760

MicroCALL Services
P.O. Box 650
Laurel, MD 20707
301/776-5253

Micro-Systems Software
4301-18 Oak Circle
Boca Raton, FL 33431
800/327-8724

Studio Computers
999 South Adams
Birmingham, MI 48011
313/645-5365

Sunflower Software
13915 Midland Drive
Shawnee, KS 66216
913/631-1333

Index to *Sextant* #1–#12

This index covers the first twelve issues of Sextant, *from Spring 1982 through this issue, September-October 1984.*

The articles are categorized by subject; and many of the articles are listed more than once. The first column of each entry contains the issue number. The page number is given after the title of the article. Back issues are available for $3.50 from Sextant.

Issue # Article

Academic Computer Use
6 Passwords and Record-Keeping: One School's Solution, p. 37
8 The '89 Goes to College, p. 23
9 A Z100 on Every Desk: Clarkson College, p. 8

Assembly Language, see Programming

BASIC, see Programming

Book Reviews
3 Experiment with Artificial Intelligence on your Heath/Zenith Computer, p. 31
5 Zenith/Heath Computers: Words & Pictures, p. 65

Business
3 How to Save Kilobucks with a Business Microcomputer, p. 51
4 Eight Spreadsheets Compared: Charting Products to Eliminate Tedious Calculations, p. 40
7 dBASE II Comes to Heath/Zenith, p. 9
12 1-2-3 for the '110/120, p. 47

Communications
2 Zenith Introduces Smart Communications Terminal, p. 43
12 Z-DOS Communications Roundup, p. 69
12 Communing by Computer, p. 41

Community News
Fairs and Conferences
2 Heath/Zenith Independent Support Highlights the 7th West Coast Computer Faire, p. 8
2 The First Ever: National Heath/Zenith Users' Conference, p. 80
4 HUGCON 1, p. 7
4 Coming Attraction: the Heath/Zenith Community Goes to the Faire, p. 92
5 CHUGCON 82, p. 7
5 New Products I'd Like to See: CHUGCON 82 Banquet Remarks, p. 16
6 CP/M '83, p. 11
6 At the Faire: The Heath/Zenith Community, p. 65
8 HUGCON 2—Twice as Good, p. 81
9 CHUGCON 83: Sharing Expertise, p. 41
11 Scuttlebutt at the Faire, p. 49
Heath Company/Zenith Data Systems
1 Heath/Zenith Computers: An Interview and Overview, p. 4
1 What's a Company Like Zenith Doing in the Computer Business?, p. 75
Heath User Groups
5 A Look at Local Heath Users' Groups, p. 6
5 HUGs: Enjoyable Education, p. 21
5 *Sextant* Survey: Local HUGs, p. 33
5 1983 Local HUG Directory, p. 44
5 Helping People: Heath Users and Heath Computers in New Jersey, p. 36
10 Forming a Local HUG, p. 25
12 Communing by Computer, p. 41

Compatibility
9 Why Won't All That IBM-PC Software Run on My Z100?, p. 51
10 Windows Opens the Door to Compatibility, p. 9
11 Zenith Improves on the IBM Personal Computer, p. 9

CP/M, see Operating Systems; see also Software

Disk Controllers
4 Venturing Beyond the Heath/Zenith Disk Controller, p. 67
4 A Survey of Disk Controller Alternatives, p. 74

Disk Drives
11 The Z67 Winchester: Use It With HDOS as Well as CP/M, p. 37

Disk Emulators
6 Taking a Look at Magnolia's Invisible Disk, p. 35
10 Put an Electronic Disk into Your H8, p. 33

Education
5 The Heath Educational Robot: Dramatically Instructive, p. 83
8 Kids & Computers: Herbert Is My Best Friend, p. 8
10 Educational Software Roundup, p. 43

Entertainment
1 Rubik's Cube: A Computer Simulation in Microsoft BASIC, p. 43
6 Program Some Improbable Prognostications, p. 81
7 BASIC Battleship, p. 25
8 Games Roundup, p. 45
12 A Canoe Ride in BASIC, p. 65

Fairs, see Community News

Family Computing
7 Confessions of a Technoklutz, p. 97
8 Kids & Computers: Herbert Is My Best Friend, p. 8
9 How One Family Learned to Live with an H89: A Dialogue, p. 91

Fans
5 Improve Your H8's Reliability: Add a Fan, p. 63

File and Disk Management
7 Index Your HDOS Disks, p. 88
9 Disk and File Management, p. 97

FORTRAN, see Programming

Graphics
1 How to Turn Zenith Screen Graphics into Color Slides, p. 25
3 Graphics on Your H8, p. 79
4 IMAGE: a Word and Picture Processor, p. 35
9 Drawing on Your Heath/Zenith Computer: Ed-A-Sketch, p. 17
9 Screen Dump!, p. 61
10 Color Graphics for Your '8 or '89, p. 15
10 Graphics Algorithm Optimized for 8080 or Z80, p. 63

H8
3 The H8's Fifth Anniversary: Origins and Outlooks, p. 11
3 Graphics on Your H8, p. 79
4 A Survey of Disk Controller Alternatives, p. 74
5 Improve Your H8's Reliability: Install the Trionyx Motherboard, p. 57
5 Improve Your H8's Reliability: Add a Fan, p. 63
7 Make Your '8 Think Like an '89—Only Faster, p. 29
10 Color Graphics for Your '8 or '89, p. 15
10 Put an Electronic Disk into Your H8, p. 33
11 The Z67 Winchester: Use It With HDOS as Well as CP/M, p. 37

H11
3 Public Domain Software for Your H11, p. 63
4 Getting There Faster: Benchmarking Math Chip vs. Compiler, p. 62

H19
6 Automatic Key-Repeat for your '19 or '89, p. 79

H/Z89
1 A Parallel Interface for the '89, p. 61

3 Give Your '89 a Boot—Automatically, p. 55
4 Venturing Beyond the Heath/Zenith Disk Controller, p. 67
4 A Survey of Disk Controller Alternatives, p. 74
6 Taking a Look at Magnolia's Invisible Disk, p. 35
6 Waldo and Artra, Inc., p. 45
6 Automatic Key-Repeat for your '19 or '89, p. 79
8 Adding 16K Memory to the '89—A Low-Budget Alternative, p. 65
9 Build a Sound/Clock Board for Your '89, p. 78
10 Color Graphics for Your '8 or '89, p. 15
11 The Z67 Winchester: Use It With HDOS as Well as CP/M, p. 37
12 Dual Speed on your '89, p. 17

H/Z110/120
2 Introducing: the Brain of the Z-Machine, p. 99
2 The Z100 Series: New Zenith Computer Line Offers Something for Everyone, p. 106
3 The Z100's User's Manual: Clear, Concise, and Useful, p. 71
7 Building Heathkit's H120, p. 45
7 A Human Factors Evaluation of the Z110, p. 55

H/Z150
11 Zenith Improves on the IBM Personal Computer, p. 9

Hardware Enhancements, see listings by computer model; e.g., H8

Heath Company, see Community News

Heath User Groups (HUGs), see Community News

HERO
5 The Heath Educational Robot: Dramatically Instructive, p. 83

Interfaces
1 A Parallel Interface for the '89, p. 61

Keyboard
6 Automatic Key-Repeat for your '19 or '89, p. 79

Memory
6 Taking a Look at Magnolia's Invisible Disk, p. 35
8 Adding 16K Memory to the '89—A Low-Budget Alternative, p. 65
10 Put an Electronic Disk into Your H8, p. 33

Moving
2 What to Do with Your H88/89 After the Movers Have Finished Playing Soccer and Dropsy with It, p. 29
12 You Can Take It With You: Your Computer in a Low-Tech Environment, p. 11

Operating Systems
CP/M
5 An Introduction to CP/M for Assembly Language Programmers, p. 69
6 CP/M '83, p. 11
8 A New CP/M for the '89, p. 68
HDOS
2 Crucial Secrets of HDOS Let You Write Device-Independent Programs, p. 45
4 Interrupt Programming Under HDOS, p. 78
5 Understanding HDOS, pp. 12, 24, 40
6 Squeeze More Disk Space Out of HDOS, p. 33
9 More on HDOS STAND-ALONE, p. 71
Z-DOS
8 Getting into Z-DOS Assembly Language—Quietly, p. 89
10 Windows Opens the Door to Compatibility, p. 9
10 Take Advantage of Z-DOS Batch Files, p. 79

Pascal, see Programming

Print Spoolers
1 Print Spoolers: A Background and Reviews of Six Software Products to Break Your Printer Bottleneck, p. 32
6 Inside a Spooler, p. 85

Printers
6 Letting Lindley Systems Drive Your Epson Printer, p. 55
8 Letter-Quality Printing on a Dot-Matrix Budget, p. 15
8 More Than Just a Pretty Typeface, p. 39
9 Create Forms on Your MX-80, p. 33
10 Doctor Your Daisywheel Device Driver, p. 37
11 Four Letter-Quality Printers Under $1,000, p. 21

Programming
Assembler
1 Disk Programming Without HDOS, p. 48
2 Crucial Secrets of HDOS Let You Write Device-Independent Programs, p. 45
4 Interrupt Programming Under HDOS, p. 78
5 An Introduction to CP/M for Assembly Language Programmers, p. 69
8 Getting Into Z-DOS Assembly Language—Quietly, p. 89
9 Screen Dump!, p. 61
BASIC
1 Benton Harbor BASIC Tests Typing Reaction Time, p. 30
1 Rubik's Cube: A Computer Simulation in Microsoft BASIC, p. 43
2 Renumbering Benton Harbor BASIC, p. 58
2 Put Some Structure in Your BASIC Programming, p. 83
3 Double-Precision Trig Functions, p. 62
5 Format Your BASIC Programs for Readability and Ease of Modification, p. 51
6 Program Some Improbable Prognostications, p. 81
7 BASIC Battleship, p. 25
8 More Double-Precision Trig Functions, p. 98
9 Optimizing Benton Harbor BASIC's Numerical Output, p. 25
9 Create Forms on Your MX-80, p. 33
10 Turn Your Computer into an Electronic Typewriter, p. 30
10 Classy Bar Graphs, p. 55
11 Exploring MBASIC Roundoff Error, p. 33
12 BASIC Grocery Shopping, p. 23
12 A Canoe Ride in BASIC, p. 65
Forth
12 Forth Goes Heath/Zenith, p. 27
FORTRAN
6 Avoid Unnecessary FORTRAN Input, p. 61
Pascal
1 A Candid Look at Tiny Pascal, p. 53
6 Pascal Elucidated, p. 27

Focus on your system, with
How to Use: Zenith/Heath Computers

Get the guide to your microcomputer system—a 144-page book by Hal Glatzer, specifically for the Zenith/Heath user.

Serving as both an introduction to computing for the novice, and a reference tool for the expert, *Zenith/Heath Computers* features:
- ideas to help you develop your system
- a survey of software compatible with your hardware
- reviews of peripheral products such as: disk drives—expansion interfaces—print spoolers—modems—letter-quality and dot-matrix printers
- a glossary, an index, and a list of suppliers supporting your system
- photographs and illustrations to clarify technical information

This is not a complicated users manual!
Published December 1982 by S-A Design Books.

ORDER YOUR COPY TODAY!
Simply fill out this coupon now, and send it to:
Sextant Publishing Co., Dept. S12,
716 E Street S.E., Washington DC 20003 • 202/544-0900

☐ YES! Send me ___ copies of *How to Use: Zenith/Heath Computers*
at $19.95 each = _____
☐ Payment enclosed (checks must be in U.S. dollars payable on a U.S. bank)
☐ Charge my: ☐ Visa ☐ MasterCard
Card # _____ Expires _____
Send via: ☐ UPS ☐ Parcel Post Special Handling

Name _____
Address _____
_____
_____

Circle #191 on Reader Service Card

11 Introduction to Pascal: Part 1, p. 73
12 Introduction to Pascal: Part 2, p. 57

Software, by Operating System

CP/M

1 Print Spoolers: A Background and Reviews of Six Software Products to Break Your Printer Bottleneck, p. 32
4 IMAGE: a Word and Picture Processor, p. 35
4 Eight Spreadsheets Compared: Charting Products to Eliminate Tedious Calculations, p. 40
5 Cooking with "Computer Chef," p. 49
7 dBASE II Comes to Heath/Zenith, p. 9
7 Word Processing You Can Program, p. 33
7 Z100 Software Roundup, p. 64
8 Games Roundup, p. 45
8 A New CP/M for the '89, p. 68
9 Drawing on Your Heath/Zenith Computer: Ed-A-Sketch, p. 17
9 Screen Dump!, p. 61
10 Educational Software Roundup, p. 43

HDOS

1 Print Spoolers: A Background and Reviews of Six Software Products to Break Your Printer Bottleneck, p. 32
1 A Professional Writer Looks at Budget Word Processing, p. 14
3 Budget Word Processing: A Followup, p. 59
4 Eight Spreadsheets Compared: Charting Products to Eliminate Tedious Calculations, p. 40
4 T & E associates: "Just Home Folks" Implementing HDOS Utilities, p. 57
8 Tracking Home Finances with the Home Finance System, p. 31
8 Games Roundup, p. 45
9 Drawing on Your Heath/Zenith Computer: Ed-A-Sketch, p. 17
9 Create Forms on Your MX-80, p. 33
9 Screen Dump!, p. 61
12 BASIC Grocery Shopping, p. 23

Z-DOS

7 Word Processing You Can Program, p. 33
7 Z100 Software Roundup, p. 64
8 Games Roundup, p. 45
10 Windows Opens the Door to Compatibility, p. 9
10 Educational Software Roundup, p. 43

TRANSACTION! ™

A tax program, a checkbook program, and a budget program all in one easy-to-run, menu-driven program. The complete personal home finance program for all your financial transactions.

- Comes completely set up with over 80 accounts for detailed entry to 1040, 1040A, 1040B, schedule C and more
- Balances your checkbook as you make entries
- Up to 200 user-definable accounts
- Allows up to 50 separate cash/checking accounts
- Over 15 print-outs including yearly totals that interface directly to your 1040, 1040A, 1040B, schedule C and others, Month-to-date, Quarter-to-date, Year-to-date reports, and Transaction register
- Allows budgeting for each account. Will also flag over-budget accounts
- Can post one check to multiple accounts
- Available in both **single drive** or **dual drive.** System requires hard-sectored H89, H88, H8 • CP/M operating system • 64K • any printer with condensed print (for 132 column reports).
- Set includes run disk, data disk (completely set-up), practice data disk, easy to follow manual and sample print-outs.

ONLY $70.00 (shipping included—allow 4 weeks for delivery)

Send check or money order to:
Night Owl Computer Works
P.O. Box 30445
Phoenix, Arizona 85046
602/581–1206

CP/M is a registered trademark of Digital Research.
TRANSACTION! is a registered trademark of Night Owl Computer Works.

Circle #198 on Reader Service Card

11 Pi à la Mode on the Z100, p. 17
12 Z-DOS Communications Roundup, p. 69
12 1-2-3 for the '110/120, p. 47

Speed Improvements

3 The World's Fastest Sort?, p. 35
4 Getting There Faster: Benchmarking Math Chip vs. Compiler, p. 62
7 Make Your '8 Think Like an '89—Only Faster, p. 29
10 Graphics Algorithm Optimized for 8080 or Z80, p. 63
12 Dual Speed on your '89, p. 17

Spreadsheets

4 Eight Spreadsheets Compared: Charting Products to Eliminate Tedious Calculations, p. 40
12 1-2-3 for the '110/120, p. 47

Standard Operating Procedure

9 Disk and File Management, p. 97
10 Take Advantage of Z-DOS Batch Files, p. 79
11 Routinizing Repetitive Reports, p. 80

Suppliers

2 The *Buss* Directory of Independent Suppliers for Heath/Zenith Users, Revision 6, p. 63
3 Putting the "O" in "OEM": Magnolia Microsystems, p. 25
4 T & E associates: "Just Home Folks" Implementing HDOS Utilities, p. 57
6 Waldo and Artra, Inc., p. 45
6 Letting Lindley Systems Drive Your Epson Printer, p. 55

Terminals

2 Zenith Introduces Smart Communications Terminal, p. 43
6 The Z29 Terminal, p. 97

Word Processing

1 A Professional Writer Looks at Budget Word Processing, p. 14
3 Budget Word Processing: A Followup, p. 59
4 IMAGE: a Word and Picture Processor, p. 35
7 Word Processing You Can Program, p. 33
10 Turn Your Computer into an Electronic Typewriter, p. 30
11 Routinizing Repetitive Reports, p. 80

Z-DOS, see Operating Systems; see also Software

Zenith Data Systems, see Community News

Miscellaneous

7 Unconfusing the New User, p. 17
8 Heath/Zenith Users in Uniform, p. 75
9 Guide to Writing for *Sextant*, p. 73
11 Build a Portable Computer Stand, p. 52
12 Index to *Sextant* #1–#12, p. 78

Back Issues of *Sextant* are still available!

To order, just tell us what issues you want, and send $3.50 for each issue ($6.50 overseas) to:

Sextant
716 E Street, S.E.
Washington, DC 20003

Please enclose payment with order. We accept checks (in U.S. dollars payable on a U.S. bank), money orders, Visa, and MasterCard.

Issues will be sent by first class mail upon receipt of payment.

Scuttlebutt

Clarkson University continues to get **media attention** since issuing Z110s to the entire freshman class. The May issue of *Life* magazine had a five-page story on Clarkson. It covered the **expectations and reactions** of both students and faculty. Their judgement? "Many early doubters . . . found their Z100s to be versatile academic tools." The big **disaster** was a power outage the **night before English papers were due.**

Clarkson isn't the only college where Z100s are making waves. The Z-Machine was the cover story of a recent issue of the alumni magazine from **Northwestern University Business School**. One of the deans reported that "students and faculty are delighted with the Z100s." He also commented on the **"close cooperation"** the school received from **Jerry Pearlman**, president of Heath/Zenith parent Zenith Electronics Corporation. (Nice to know he keeps up his interest in computers. While still a humble V.P., Pearlman was responsible for getting Zenith to purchase the Heath Company.)

Scattering Z100s around college campuses seems to be bringing out the **incipient hacker** in students and faculty alike. And ZDS wants to benefit from it. A note from Mike Lougee on the University of Michigan's Z100 bulletin board pointed out that "Zenith Data Systems is looking for a **'wish list' of product enhancements and new products** for its computer line, and wants feedback from Zenith users at Michigan." (Well, there's no need to limit that to folks at the University of Michigan. If you have suggestions, you can contact Randall E. Griffin, Vice President for Product Management and Planning, ZDS, Hilltop Road, St. Joseph, MI 49085.)

And in case "that word" (hacker) raises any hackles, we pause for a brief **editorial**. "Hacker" does *not* mean "criminal"—as some klutzes in the general press use it. (Even *InfoWorld* magazine used it that way until chastised by readers.) No, "hacker" is the only good word to describe many of us: people who go in and find out **what makes things tick**. You might be a hobbyist or a professional, but even when you get paid for it, you do it because it's **fun or a challenge**. *Sextant*, then, is *not* going to pervert the word "hacker" by using it to mean "thief" or "vandal." (If that's what "hacker" means, then what's a "hardware hacker"? Someone who takes an axe to a computer?) Oh well, mutter grumble snarl, end of editorial.

But while we're still on criminals and computers: if you take part in or run a **bulletin board**, consider the **Tom Tcimpidis** case carefully. He's active in the Heath/Zenith community and **system operator** of a bulletin board in Mission Hills, California. Someone put a Pacific Telephone **credit card number** on his and a number of other bulletin boards. (Pacific Bell is hot on the subject. Last year, they lost $23 million to fraud.) So Tom got a visit from the Los Angeles Police Department. They departed, giving him a summons and **taking his computer equipment**. The City of Los Angeles apparently read the law in such a way that they could confiscate a supermarket if a credit card number got put on the cork board near the door. (But an H89 is **easier to carry**.)

Fortunately, the Los Angeles city attorney did not agree. **No charges will be pressed**. The threat is still there, though, that bulletin boards could be subject to legal harassment. Pacific Bell generously suggests an easy way out for SYSOPs—just read **every word of every message** before they let it go on the board.

Jim Buszkiewicz is the new **SYSOP** for the Heath Users' Group bulletin board (HUG SIG) on CompuServe. (He replaces Terry Jensen, who left HUG to strike out on his own as a software developer.) Jim has written from time to time for HUG's *REMark* magazine. For those into the history of the HUG bulletin board, HUG SIG's introduction to Jim noted that he's the original **Blackmax** (the board's **"mystery commentator"**). Also, his picture can be seen on the back cover of *REMark* #21, October 1981. (That was "The Halloween Issue." The covers drew quite a bit of flak from HUGgies. You've got to see it to understand the flak it drew, but **"Halloween"** should be a tip off.)

Zenith Data Systems has a new president. He's **Carl Michelotti**, formerly Zenith's vice president for color TV engineering. He comes from an almost exclusively **hardware background**, in both his career with Zenith and, prior to that, with Admiral television.

Michelotti's predecessor, **Donald Moffett**, has gone to **Fujitsu**. (They, like Heath/Zenith, are one of the few computer companies that offer **dual central processors**.) Apparently, there might have been a **"bidding war"** for Moffett's services. Back in the spring of this year, rumors circulated that he was going to resign. Then **no**, he was staying. It appears that Fujitsu made the **grass greener** on their side of the fence.

And speaking of green grass and fences and such, the **farmers** among you might have noticed that Heath/Zenith has been sneaking into the pages of **American Agriculturalist**. A big article on how to use computers showed the author hard at work—in front of an H19. And in February, the back cover ad had a re-labelled '89 splashed all over it—courtesy of Babson Brothers Co. and their Surge Infarmation System.

Zenith continues to make the **H/Z150** and **'160** more perfect **clones** of the IBM Personal Computer—"more perfect" in the sense of doing the same job as the IBM, but better and with extras. This time it's a **new ROM**, version 1.7. It clears up a couple of stray IBM-incompatibilities. (For instance, the '150 can now run the IBM monochrome card.) If you've got a '150, check with your dealer: you may be able to get the new ROM as an **exchange**.

Apparently a lot of **McDonald's** dealers are using Z110s, and we're told they think it's **"the cat's pyjamas."** Sounds as if they're doing it *our* way.

The *Sextant* staff has been increased by **four**. (Well, for the summer, anyway.) **Dave Felstul** is a writing intern from the academic world's **H89 capital**: Saint Olaf College in Minnesota. **Vickie Saxon**, from Princeton, is a production assistant. She was here last summer, too. (Remember the Table of Contents picture in issue #7 for "Unconfusing the New User"?)

Another summer intern, **Sally Juram**, was here for a few weeks (making sure that *Sextant* continues to be **dominated** by folks from **Swarthmore College**). She did office work in circulation and advertising. And shortly after she left, we were joined by **Dan Conaway**, from Allegheny College in Pennsylvania. He's here for the summer doing much the same work.

Classified Ads

Hardware

H110, two 320K drives, 192K memory, ZA-100-1 ROM upgrade, software, manuals, Mannesmann-Tally 160L printer, USI Pi-3 amber monitor, all cables, accessories. Package only for $2,300 + shipping. John Gifford, P.O. Box 248106, Univ. of Miami, Coral Gables, FL 33124, 305/284–2535.

OKIDATA PRINTERS. Special prices on Okidata, Abati, C. Itoh printers. Okidata 93P only $690. Save on software. Free price list. Ohio residents add 5½% sales tax. Phone 513/426–6803. Beta IV, P.O. Box 1463, Fairborn, OH 45324.

Software

Z100 BOOKS & SOFTWARE: Graphics, data plotting, statistics, engineering, 3D structural analysis books & software for the Z100. Books contain program listings in BASIC with full documentation. Disks contain same programs in Z-BASIC. Perfect for software developers, educators, consultants, computer hobbyists. Prices $20–$96. Send for free catalog. Kern International, 433 Washington Street, Duxbury, MA 02331, 617/934–0445.

The rate for *Sextant* classified ads is 75¢ per word, with a minimum of 15 words. Send to: Sextant, Classified Ads, 716 E Street S.E., Washington, DC 20003 (202/544–2868). Please include your name and address for our records. Deadline for the November-December issue is September 7; the deadline for the January-February 1985 issue is November 9.

Coming up in *Sextant*:

- **software to transfer files from an H8 or '89 to a Z100**
- **a review of Trionyx's mass memory system for the H8**
- **a Tiny Pascal program to help solve cryptograms**
- **an MBASIC error-trapping routine that gives you the full error messages**
- **a review of Microsoft's Word and Mouse on the Z150**
- **a look back on the H89's first five years**
- **hints on how to make Z-BASIC friendlier—including how to reprogram the function keys**
- **a parallel port add-on for the H/Z89 serial board**

Luminaries

Ray Albrektson lives in Baguio City, Philippines, where he is a faculty member of the International School of Theology—Asia. So he's well qualified to speak on the horrors of taking your computer overseas. He's interested in applying computer technology to theological education in the Third World.

Ray Dotson is a ZDS dealer "immediately outside the main gate of Seymour Johnson AF Base (where they're getting their share of the $29,000,000 purchase of Z100s)." He manages to get away to a beach house almost every weekend, though—which may be where he got the idea for the canoe story.

Brian Ence works for Leeds and Northrup Company as a physicist in the corporate research division. He works on the development and production of hybrid circuits. Brian doesn't currently use Forth at work but wishes he could. He has had a long interest in electronics and computers as a hobby. **Christine**, formerly a biochemist, is now a freelance technical writer.

Alan K. Gideon is a Lieutenant Commander in the Navy, working in preliminary ship design at the Naval Sea Systems Command. His favorite use of his H89 is mathematical simulations with graphical output. "Although that sounds rather dry, the challenge of making a small machine act like a mainframe can be quite a kick!" With all these calculations, you can see why increased CPU speed becomes a necessity.

Stephen C. Noeller is an electronics technician in the Air Force. We hope the rapport he has with the machines on active duty is more consistent than that which his cartoons' protagonist has with HERO.

Wayne Rash, Jr., back in the pages of *Sextant* for the fourth time, is a Lieutenant (j.g.) in the U.S. Navy. As with all government employees, his opinions on spreadsheets—as with those on printers, data processing, and memory—are not necessarily those of his employer. (Although he reports having memory problems with Lotus 1-2-3 at work.)

Robert L. Schlessman said most of it in his article, but we'll repeat it here. He's an electronics technician with PPG, a leading glass manufacturer, in Illinois. And he's head programmer for a family of four—which has plenty of use for a grocery-list program.

William N. Tavolga is Senior Research Scientist at Mote Marine Laboratory in Sarasota, Florida. He also enjoys computer building and programming, ham radio, and enology—the study of wine and wine-making. Having written laboratory manuals in biological techniques, applying this talent to programming was only a step away.

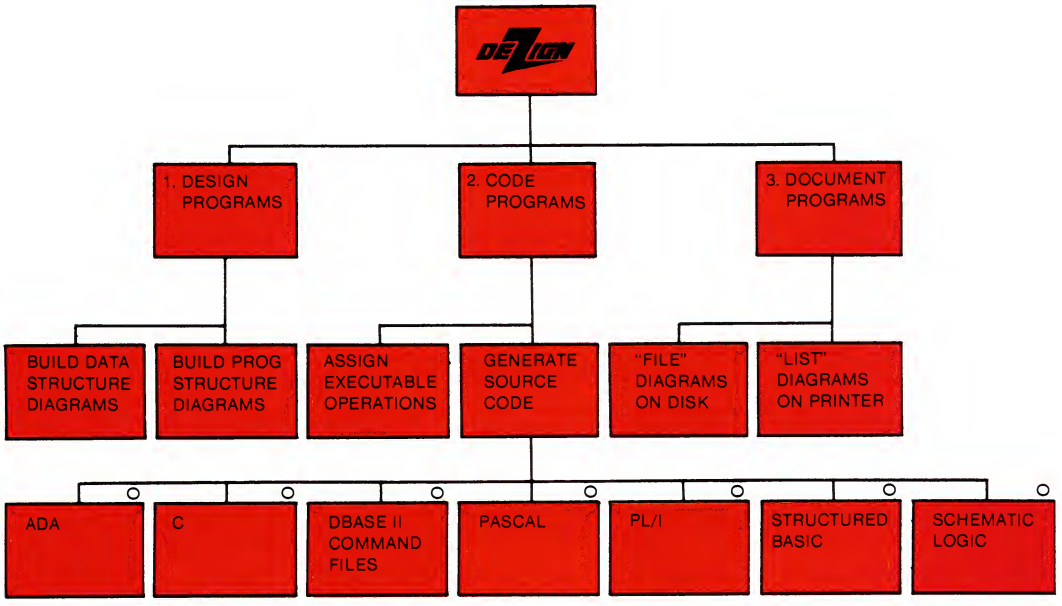
Authors:

Have you considered writing an article for *Sextant*? We're looking for human-interest stories, in-depth technical features, program descriptions, product reviews, and tutorials which relate specifically to Heath/Zenith systems. We pay more than many other microcomputing magazines. Send your article, idea, rough draft, or outline to: John Walker, Technical Editor, Sextant, 716 E Street S.E., Washington, DC 20003.

EVERY PROGRAMMER/SYSTEMS ANALYST NEEDS . . .

DEZIGN

. . . THE STRUCTURED PROGRAMMING TOOL FOR THE 80s!



Design your programs right on the screen, using modern structured programming techniques based on the Jackson Program Design Method (JSP)! **DEZIGN** is truly the programmer/analyst's friend – more than just another flowcharting tool!

DEZIGN – an integrated tool for designing programs, generating source code in the language of your choice, and documenting your programs for future reference! Even non-programmers will enjoy using **DEZIGN** to build family trees and organization charts!

Available, as follows, from Zeducomp and Heath/Zenith dealers:

			Column A	Column B
☐ DEZIGN	Z-89	CP/M (Hard sector)	$ 70.00	$140.00
☐ DEZIGN	Z-90	CP/M (Soft sector)	$ 70.00	$140.00
☐ DEZIGN	Z-100	CP/M-85	$ 70.00	$140.00
☐ DEZIGN-86	Z-100	CP/M-86	$100.00	$200.00
☐ DEZIGN-16	Z-100	Z-DOS	$100.00	$200.00

Column A Prices include one Source Code Generator of your choice; column B prices include all Source Code Generators shown above.

ALSO AVAILABLE FOR THE IBM PC AND ZENITH Z150!

ZEDUCOMP

P.O. BOX 68 ● STIRLING, NJ 07980 ● (201) 755-2262

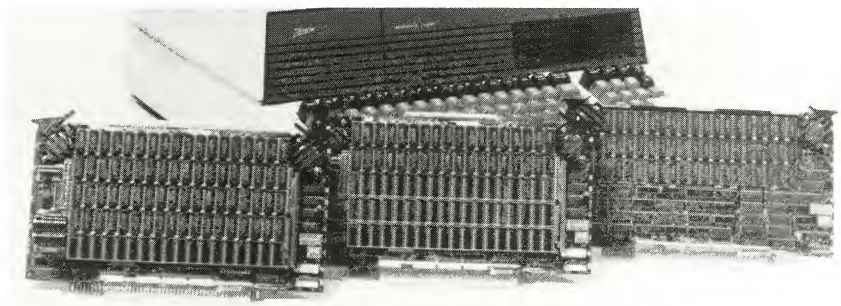
JSP is described in "Principles of Program Design", by Michael Jackson, Academic Press.

CP/M is a trademark of Digital Research, Inc. dBASE II is a trademark of Ashton-Tate, Inc. Z-DOS is a trademark of Zenith Data Systems.

Circle #139 on Reader Service Card

Supplier Notes

S-100 Memory Boards Boost Z100 Memory to One Megabyte



Add-in memory boards from Macrotech International can boost the Z100's 128K main memory to as much as a full megabyte. The three new Z-Series boards, the 384Z, 640Z, and 896Z, expand the Z110/120's memory to 512K, 768K, and 1024K, respectively.

All Z-Series boards come with Macrocache pseudo-disk operating software on a 5¼" disk. This provides the capability of disk emulation in RAM through virtual-disk and full-cache memory capability.

Through the virtual-disk feature, the Z100 can address a user-specified portion of a Z-Series memory board as if it were a disk drive. In this mode, the Z110/120 can access data at 150 nanoseconds, significantly faster than conventional disk access. Virtual-disk use can speed up program execution significantly, especially where disk accesses are frequent.

Cache memory is a user-specified amount of RAM memory, which holds certain data readily available until required by the user or program. This speeds up program execution by reducing the number of disk accesses.

Macrocache software employs dynamic memory allocation in both virtual-disk and cache-memory modes. For example, cache memory acts as an expanding and contracting buffer that automatically responds to changing virtual-disk requirements. As the amount of data stored in the virtual-disk area increases, cache buffer size proportionally decreases. This maintains a standard, user-assigned amount of memory devoted to "disk" storage—even when running programs with memory blocks of frequently varying sizes.

The Z-Series boards feature full-byte parity error-detection (in accord with IEEE/696 standard error-line specifications). Prices have been set at $1,195 for the 384Z, $1,895 for the 640Z, and $2,250 for the 896Z. More information on the Z-Series boards is available from Macrotech International Corp., 9551 Irondale Ave., Chatsworth, CA 91311, 818/700–1501.

Computer Mapping Systems for Z110/120 and Z150/160

The Desktop Information Display System (DIDS) from Sammamish Data Systems is the mapping system which produced the map on this page. It was developed on the Z110/120, and is modelled after the minicomputer-based Domestic Information Display System which was developed for the White House in 1975.

DIDS incorporates the following features: provides menu-driven commands; can incorporate any data that may be broken down according to geographic areas—census tracts, five-digit ZIP codes, or counties—including data from standard data base packages such as dBASE II or Lotus 1-2-3; lets the user create customized maps; lets the user analyze data statistically, and map the statistical relationships; outputs maps to color printers, digital plotters, or color film recorders; and stores maps in disk files for rapid retrieval and display at a later time.

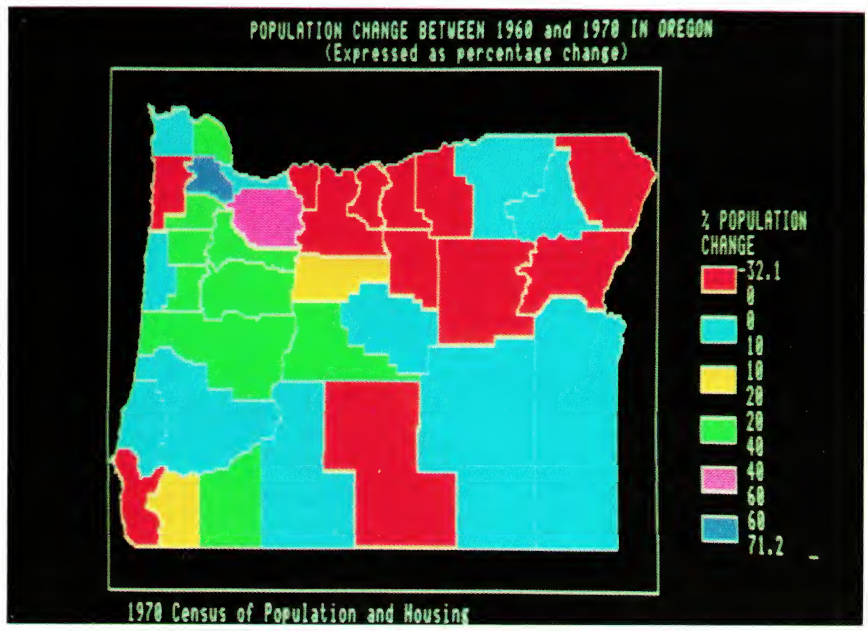
Besides the DIDS software, Sammamish Data can provide specially processed geographic coordinate files for every 1980 Census Tract in the United States, for five-digit ZIP codes in the major metropolitan counties, and for every county.

DIDS is currently available for the Z110/120 and Z150/160, the IBM PC, and the IBM XT. The DIDS software makes full use of the Z110/120's outstanding color graphics capabilities. It requires the low-profile unit or the installation of additional memory chips on the color graphics board in the "all-in-one" unit.

Minimum hardware requirements are 128K internal memory; two 320K floppy disk drives, or one floppy disk and a Winchester disk; color monitor; MS-DOS 2.0 or PC-DOS 2.0 operating system (Z-DOS 1.25 on the Z110/120).

Sammamish Data recently introduced a lower-cost version of its mapping system. DIDSjr is tailored for use by groups which have relatively low-volume requirements for computer-generated maps. Many of the features of the original DIDS package have been retained, but the design parameters of maps are not stored on disk in DIDSjr as they are with the full DIDS package.

The full DIDS system is priced at $1,500; DIDSjr is priced at $595. For further information contact Richard Schweitzer, President, Sammamish Data Systems, Inc., P.O. Box 70382, Bellevue, WA 98007, 206/644–2442.



NEW FROM FLOPPY DISK SERVICES, INC.

the H-89 TWOET SYSTEMS

We've got a great idea for your H-88, 89 or 90. It's a dual *internal* half height drive system. Two of our half height 5¼" drives can replace your built-in disk drive, doubling your information storage capacity.

Floppy Disk Services provides you with everything you need. That's two double-sided, double or single density, half height drives in either 48 or 96 tpi format, all hardware, cables and power connector adaptors. And most important, you get easy, step-by-step instructions, in the Heath/Zenith tradition of good, clear documentation.

We've thoroughly tested the TWOET/Heath set-up. Remember that a double sided 48 tpi will work perfectly as a single sided drive right out of the box! Hard or soft sectored—so you can even use this system with your H-17 controller. And of course we have the software drivers (additional cost) to run 48 or 96 tpi double sided, single density drives on the H-17.

Model TWOET 455

2 Shugart SA-455 half height
48 tpi double sided
All hardware
Metal, shielded mounting plates
Data cable with chassis connector
Power 'Y' connector
Complete documentation
Price... $565.00 complete

Model TWOET 465

2 Shugart SA-465 half height
96 tpi double sided
All hardware
Metal, shielded mounting plates
Data cable with chassis connector
Power 'Y' connector
Complete documentation
Price... $655.00 complete

Wondering what to do with your internal drive if you buy this system? Here's the solution. If you purchase a dual half height system for your Heath computer from Floppy Disk Services, just include an extra $50.00 plus shipping and receive a single 5¼ case with power supply *and* data cable ready to receive your SIEMENS internal drive! The case with data cable is normally a $70.00 item. And the cable that comes with your TWOET system includes the external chassis disk I/O connector.

Due to production deadlines, prices in this ad are 2 months old, so we encourage you to call us for current prices and new product info. Prices and specs subject to change without notice.

Dealer inquiries invited.

PAYMENT POLICY — We accept MasterCard, VISA, personal checks and Money Orders. We reserve the right to wait 10 working days for personal checks to clear your bank before we ship. All shipping standard UPS rates plus shipping & handling. NJ residents must add 6% tax.

Toll Free Order Line:
(800) 223-0306

Tech Help or Info:
(609) 799-4440

H-88/89/90 are registered trademarks of Heath Corp.

FLOPPY DISK SERVICES™ INC.

39 Everett Drive Bldg. D, Lawrenceville, NJ 08648

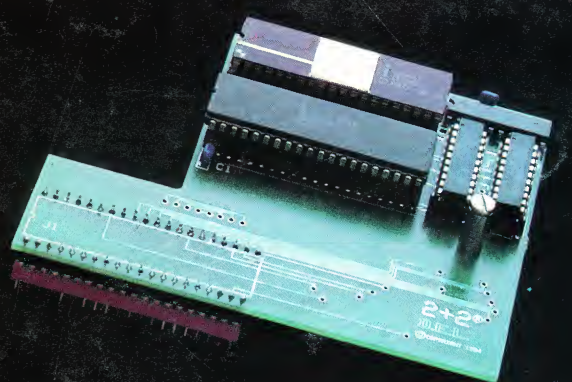
Circle #117 on Reader Service Card

REACH FOR NEW FRONTIERS

ESCAPE WITH **2+2**

THE 8087

speed and power booster for your Z100 Computer



CALL TOLL FREE
1-800-663-8331

IN CANADA CALL
(604) 274-0434

D.E.L.
PROFESSIONAL SYSTEMS INC.

Canada
12-11151 Horseshoe Way
Richmond, B.C.
V7A 4S5

U.S.A.
2110 Etna Place
Monterey
California 93940

Also available from your local Heathkit Electronic Center

Circle #178 on Reader Service Card